

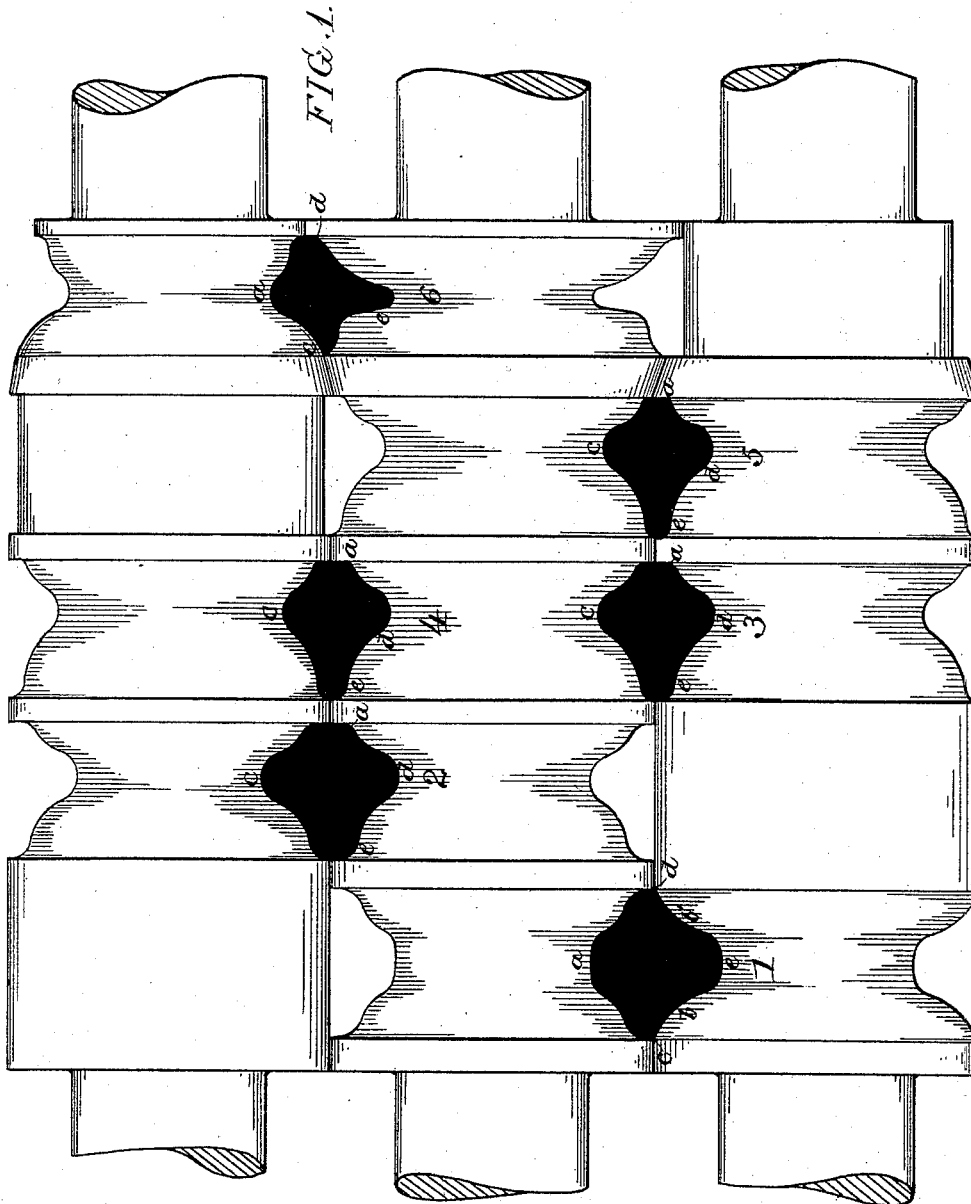
(No Model.)

2 Sheets—Sheet 1.

H. W. THOMAS.  
ROLLS FOR ROLLING GIRDER RAILS.

No. 417,956.

Patented Dec. 24, 1889.



Witnesses  
*Alex. Barkoff*  
*R. Schleicher.*

Inventor:  
*Henry W. Thomas*  
*by his Attorneys*  
*Hewson & Hewson*

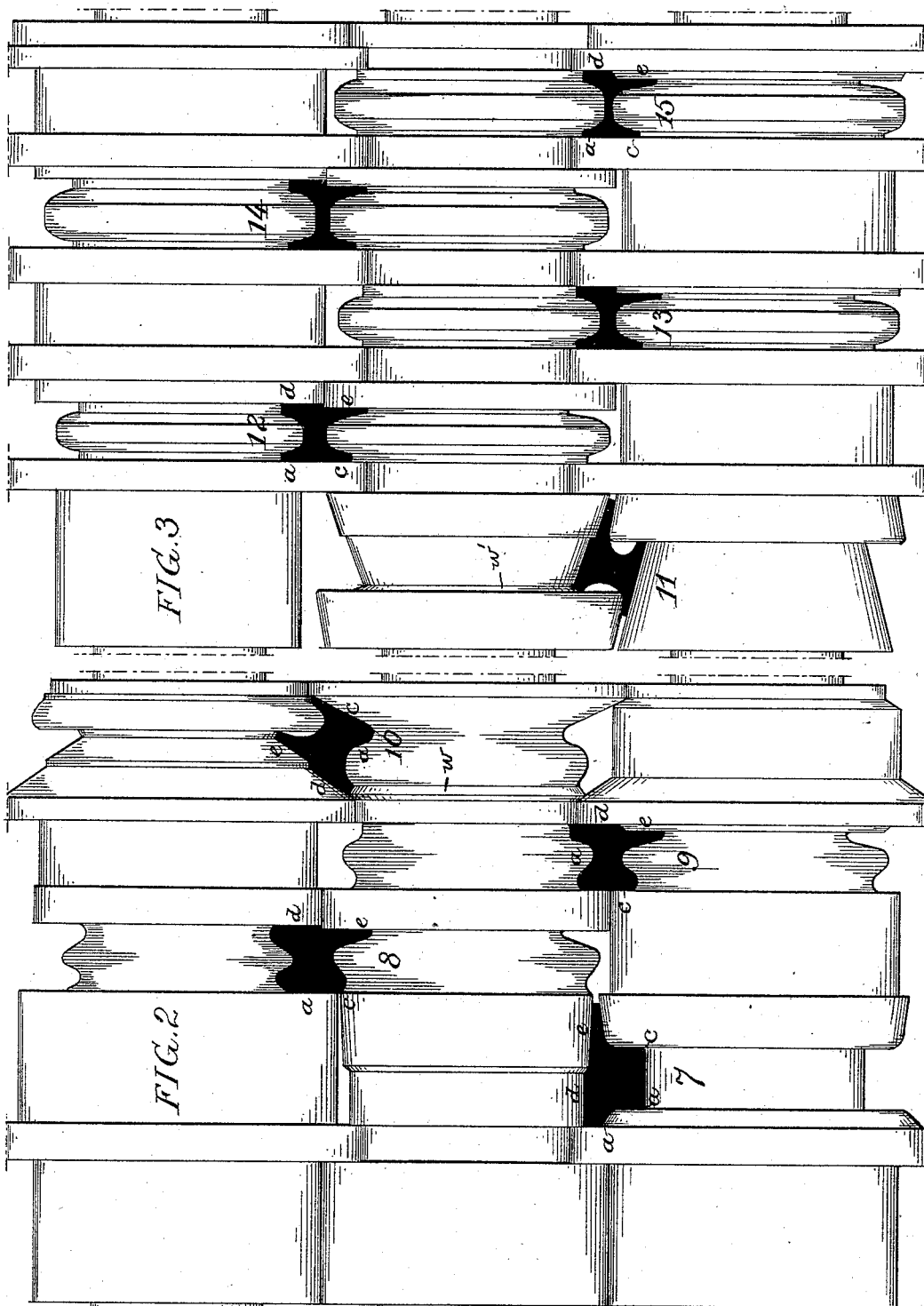
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# UNITED STATES PATENT OFFICE.

HENRY W. THOMAS, OF DANVILLE, PENNSYLVANIA, ASSIGNOR TO THE  
NORTH BRANCH STEEL COMPANY, OF SAME PLACE.

## ROLLS FOR ROLLING GIRDER-RAILS.

**SPECIFICATION** forming part of Letters Patent No. 417,956, dated December 24, 1889.

Original application filed May 1, 1889, Serial No. 309,174. Divided and this application filed November 4, 1889, Serial No. 329,213. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY W. THOMAS, a subject of the Queen of Great Britain and Ireland, and a resident of Danville, Montour county, Pennsylvania, have invented certain Improvements in Rolls for Rolling Girder-Rails, of which the following is a specification.

The object of my invention is to provide rolls for reducing a rectangular bloom into a side-bearing flanged girder-rail.

In the accompanying drawings, Figure 1 is a side view of the first roughing rolls, with the passes indicated in section. Fig. 2 is a side view of the second roughing-rolls, also with the passes shown in section; and Fig. 3 is a side view of the finishing-rolls with the passes in section.

The first pass No. 1 is a quadrangular pass with rounded corners, the contour of the upper roll being practically flat at the center, with ogee-curved sides, while the bottom roll has a practically-flat center with curved sides, the groove in the lower roll being by preference deeper than that of the upper roll for the commencement of the formation of the tram portion of the rail. The bloom is passed into this pass diagonally instead of flat, as in ordinary rolling, and is acted upon on all four sides, the bloom being concaved on two sides by the ogee sides of the upper roll, while the bottom roll simultaneously gives curvature to the two opposite sides, the bloom being thus reduced to the desired form of bar to be operated on in another direction in the four following passes 2, 3, 4, and 5. The portion *a* of the bar resulting from the first pass is gradually formed into one of the flanges of the rail, while the portion *c* is formed into the opposite flange, the portion *d* being formed into the head and the portion *e* into the tram of the rail. The action of the pass 2 is to reduce the section of the bar and at the same time to continue the shaping out of the tram portion. The same is the case with passes 3, 4, and 5, the contour of the passes gradually changing to suit pass No. 6. This pass No. 6 is peculiar in form, and receives the bar turned one-quarter downward, one of the rolls having a deep groove to re-

ceive the long tram projection *e*, which was gradually formed in the prior passes. In the pass 6 the portion *d* is compressed, so as to thin it and reduce it to a rudimentary form of head, and at the same time the portion *c* is also compressed, the bar being thus given the first approximate shape of the rail. It will be understood that the groove for forming the projection *e* may be turned in the upper roll in place of the lower one without departing from my invention. The bar from pass No. 6 is inserted into pass No. 7 of the rolls shown in Fig. 2, which are the second roughing-rolls. This pass No. 7 receives the bar one-quarter turned from pass No. 6, and reduces the height of the bar, and still further shapes the head and tram, forming at the same time the shoulder between these two portions of the rail. It will be noticed that in this pass 7 the metal is not only compressed at the tram portion *c*, but also at the head portion *a*, thus preventing any distortion or twisting of the metal as it is projected from the rolls. The bar is introduced into pass No. 8 one-quarter turned. This pass is so formed as to compress the bar at the center, thus carrying forward the shaping of the web portion of the rail, and pass No. 9 continues the formation of the web. Pass No. 10 is an oblique dummy pass, the object of which is to give the proper shape to the head and to the flange directly under the tram portion of the rail, as shown, the metal of the tram portion and of the flange under the head being practically undisturbed. The first pass 11 in the finishing-rolls, Fig. 3, reduces the height of the rail, shapes the tram from its root out to the end, and also shapes the flange directly under the head of the rail in the same manner as the pass 10 shaped the head of the rail and the opposite base-flange. In both of the passes 10 and 11 it will be noticed that the projecting portions on opposite sides of the rail-bar are simultaneously acted upon, so that the bar will pass through the rolls in a straight line without distortion. As the flat portions of the passes 10 and 11 are oblique, the rolls are provided with beveled fillets *w* and *w'*, so that the two portions of each pass corresponding to the top and

outer side of the head of the rail are at right angles to each other, whereby the proper shape of the outer corner of the head is maintained for its passage through the subsequent passes, in which such right-angled corner is present. The beveled fillet *w'* also, by bearing against the end of the head portion of the bar, prevents lateral displacement of this portion of the bar, so that the tram portion will be properly acted upon. The purpose of the passes 12, 13, 14, and 15 is to gradually bring to the exact shape of the rail desired the billet that has now assumed the general form of the rail. By the above-described operations I am enabled to form a wide tram-flanged girder-rail that would be difficult, if not impossible, to make by usual methods of rail-rolling where ordinary dummy passes are used.

It will be understood that I do not limit myself to three-high rolls or to the three sets of rolls which I have termed "roughing," "second roughing," and "finishing," as two-high rolls may be used, and the passes may be put in two set of rolls, or more than three, as required.

The passes may be of different size or number, as required in rolling different sizes and weights of rails, and one or all of the passes may be transposed—for instance, the grooves in the bottom rolls may be cut in the top rolls, and vice versa—without departing from my invention.

So far as regards the function of the passes 1 and 6, it is immaterial whether the passes following pass 1 or the passes preceding pass 6 are precisely similar to those shown and described, so long as said passes are adapted to properly act on the bar delivered by pass 1 and to properly shape it for its reception by pass 6, and the same may be said of the passes preceding and following passes 10 and 11.

I do not in this application claim, broadly, the oblique dummy pass, whereby the tram portion of the rail is acted on throughout its width—that is to say, from its outer end to its junction with the web—nor that form of pass whereby a laterally-projecting portion

of the top of the rail and an opposite laterally-projecting portion at the base of the rail are simultaneously acted upon; nor do I claim, broadly, the rolls having an oblique dummy pass with beveled corners, as these features form the subject of a separate application, filed by me on the 1st day of May, 1889, Serial No. 309,174, of which this is a division.

I claim as my invention—

1. In rolls for rolling girder-rails, the first roughing-rolls having a series of grooves or passes, substantially as described, and numbered 1 to 6, as set forth.

2. In rolls for rolling girder-rails, the quarter-turn pass 6, of a contour substantially as specified, whereby the bar is given the first approximate shape of the rail.

3. In rolls for rolling girder-rails, the first diagonal roughing-pass 1, of a contour substantially as described, whereby the bloom introduced diagonally is reduced on all four faces.

4. In rolls for rolling girder-rails, the diagonal pass 10, of a contour substantially as described, whereby the thickness in the head and in the flange portion under the tram of the rail is reduced, and the head and said flange are extended laterally.

5. In rolls for rolling girder-rails, the combination of the pass 11, of a contour substantially as specified, whereby the thickness of the metal in the tram and in the flange portion under the head is reduced and extended laterally, with the preceding roughing-passes and subsequent finishing-passes, substantially as described.

6. In rolls for rolling girder-rails, the rolls having the series of grooves or passes described and numbered 7 to 15, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY W. THOMAS.

Witnesses:

J. D. HOWERY,  
L. A. JONES.