

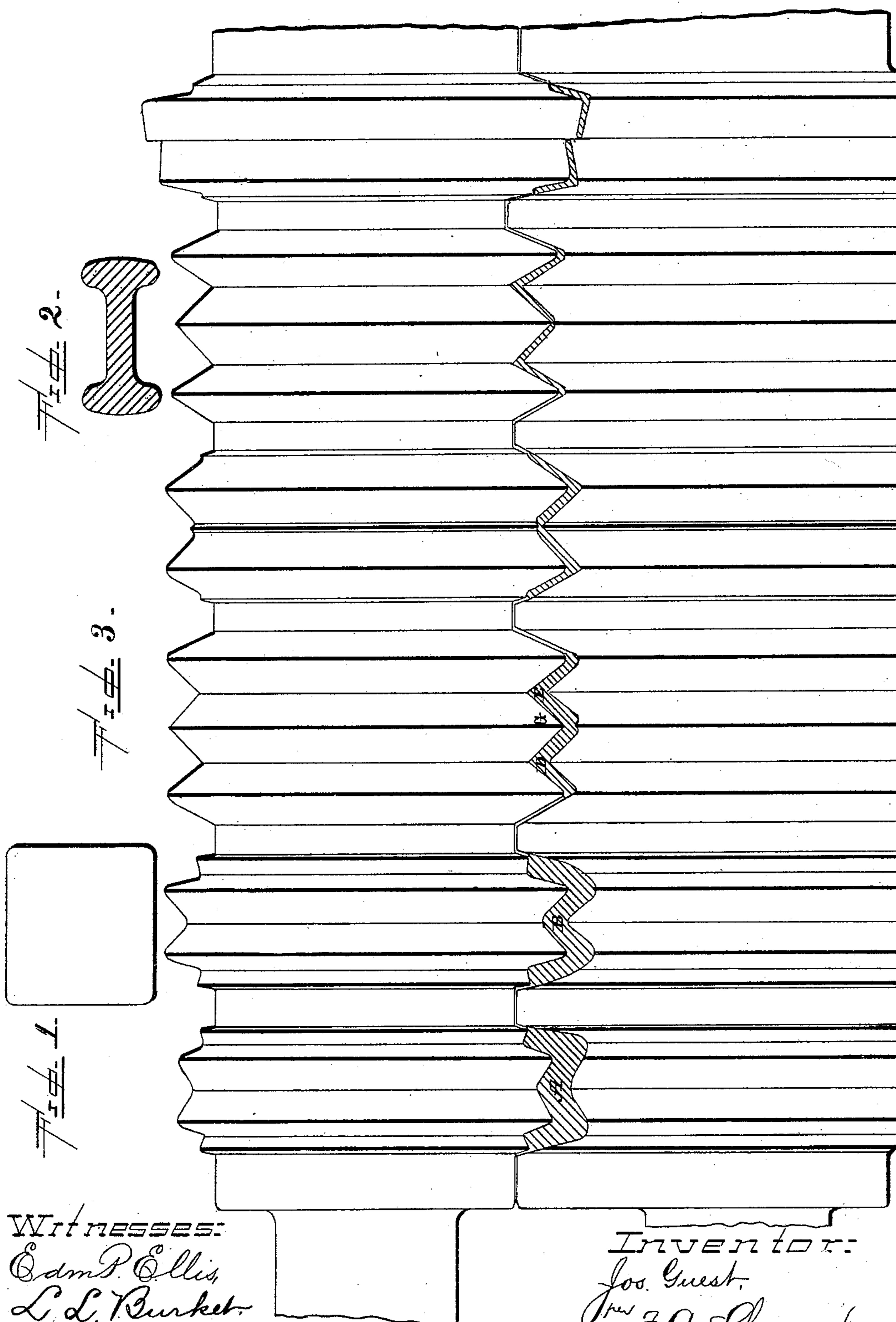
(No Model.)

2 Sheets—Sheet 1.

J. GUEST.  
ROLLING MILL.

No. 400,844.

Patented Apr. 2, 1889.



Witnesses:  
Edm. P. Ellis,  
L. L. Burkett.

Inventor:  
J. Guest,  
Per J. A. Lehmann,  
att'y.

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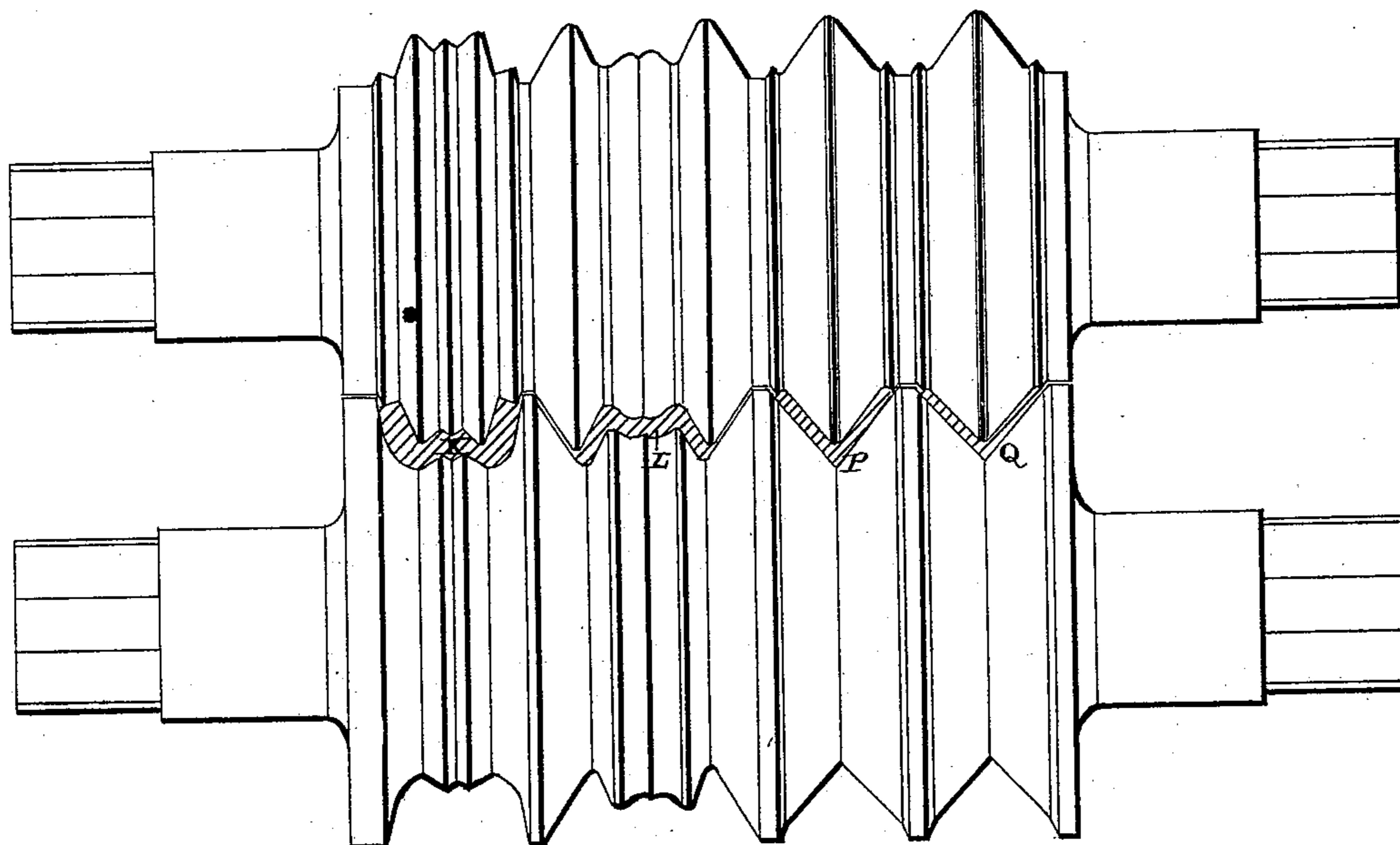
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*Fig. 4.*



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# UNITED STATES PATENT OFFICE.

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FERDINAND PROTZMAN, SR., SIDNEY M. YOUNGS, FRED E. YOUNGS, AND  
RALPH W. CARROLL, ALL OF SAME PLACE.

## ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 400,844, dated April 2, 1889.

Application filed August 16, 1888. Serial No. 282,881. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH GUEST, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and  
5 useful Improvements in Rolling Metals; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in rolling metal; and it consists in, first, rolls provided with suitably-shaped grooves for  
15 breaking down iron or metal from the bloom, pile, or a double-headed rail into a series of **W** or **M** shaped angles, and other suitably-shaped grooves, through which the **W** or **M** shaped angles are passed until the iron or  
20 metal is given the form of two angles in a single piece, and which angles are passed through a groove provided with cutting-edges, where they are separated into two distinct angles; second, rolls provided with suitably-  
25 shaped grooves for breaking down iron or metal from the bloom, pile, or double-headed rail into a series of **W** or **M** shaped angles, and other suitably-shaped grooves, through which the **W** or **M** shaped angles are passed  
30 until the iron or metal is given the form of a single angle, which will be more fully described hereinafter.

The objects of my invention are to so shape the rolls that two separate and distinct angles are formed at the same time from a single bloom, pile, or a double-headed rail, and  
35 in from five to seven passes, where to accomplish the same amount of work by the process commonly used from twenty to twenty-eight passes are required, thus greatly cheapening the cost of production and greatly increasing the capacity of any mill using my process; second, to make practical the reworking of old double-headed rails into angle-irons of the  
40 sizes most in use.

Figure 1 represents a cross-section of an ordinary iron pile or steel ingot. Fig. 2 represents a cross-section of a double-headed rail. Fig. 3 represents a pair of my rolls, and showing the progressive stages in the manufacture

of angle-irons. Fig. 4 shows a front elevation of a pair of rolls especially adapted for forming single angle-irons from double-headed rails.

A square or rectangular iron pile or steel  
55 ingot—such as is shown in Fig. 1—having been previously heated in any suitable manner, is passed through the first groove or pass, A, of the two rolls shown in Fig. 3, and which form deep angular longitudinal grooves along the  
60 bar, slightly spreading it laterally to give it the form shown. The bar is then passed through the groove in pass B, where it assumes the shape in cross-section, as shown, and which resembles the letter **W** or **M**. The  
65 bar is then passed through the grooves D and E, which are provided with a cutting-edge, G, which separates the two halves of the **W** or **M** shaped bar from each other. The two bars are then either passed again through the  
70 grooves D and E in the reverse order—*i. e.*, passing the bar which came through the groove D into the groove E and the bar which came through the groove E into the groove D, and thus roll down or remove any fin or wire  
75 edge which might be left by the cutting-edges—or they may be passed through additional finishing-grooves placed in the rolls for the purpose of a finer finish, if desired, thus making two finished angles of like shape  
80 in cross-section with less time and labor than is ordinarily required for making one. By this method of reducing the metal from the pile or ingot into angle-irons it is gotten down to the proper thickness and size for making two  
85 angles at a time in but five or six passes through the rolls, while by the process commonly used from ten to fourteen passes are required to roll one angle, and to produce two angles requires from twenty to twenty-eight  
90 passes of the metal through the rolls, while the same thing is here accomplished in but five or six passes. In making round-back angles the bottom of the grooves are given the curvature required on the back of the angle.  
95 In rolling angles from double-headed rails the first pass, A, in the breaking-down rolls is not required, as the rail will readily take the form of the second pass or groove, B. In rolling the larger angles from a double-headed rail the  
100

second, third, and fourth passes are necessarily modified, as the amount of metal in the rail will permit of forming but one angle at a time. The rail is put through the pass or  
5 groove K, Fig. 4, which gives it a similar form to that of the first pass in Fig. 3, resembling the letter **W** or **M**. The iron is then passed through the groove or pass L and the grooves P and Q, which brings the metal to the finished angle, requiring but four or, in some  
10 cases, five passes from the rail, while the process commonly used is not adapted to working upon old rails, but requires from ten to fourteen passes of the iron from the bloom or  
15 pile to make a finished angle.

In all the drawings herewith I have shown the rolls as what are termed "two-high;" but my process is equally adapted to work "three-high," and in most cases I prefer to use the  
20 three-high system.

While I have given a stated number of passes from four to seven, I do not wish to limit myself to the precise number stated, as it is evident that the varying demands of the  
25 trade for different-sized angles may require some variation from the number stated.

While this process is adapted and especially designed for working old double-headed rails into angle-irons, it is also adapted to rolling all sizes of angles from the bloom or pile, with  
30 a great saving in time and labor.

Having thus described my invention, I claim—

1. The combination of two rolls provided with a series of **W** or **M** shaped grooves, 35 through which the metal is successively passed, so as to first break down the metal, and then form it into angle-iron, substantially as shown.

2. The combination of two rolls provided 40 with a series of **W** or **M** shaped grooves for breaking down the metal and forming it into angle-iron, and cutters for separating the two halves of the double angle-iron, substantially as set forth.

In testimony whereof I affix my signature in  
45 presence of two witnesses.

JOSEPH GUEST.

Witnesses:

L. B. D. REESE,  
F. E. YOUNGS.