

(No Model.)

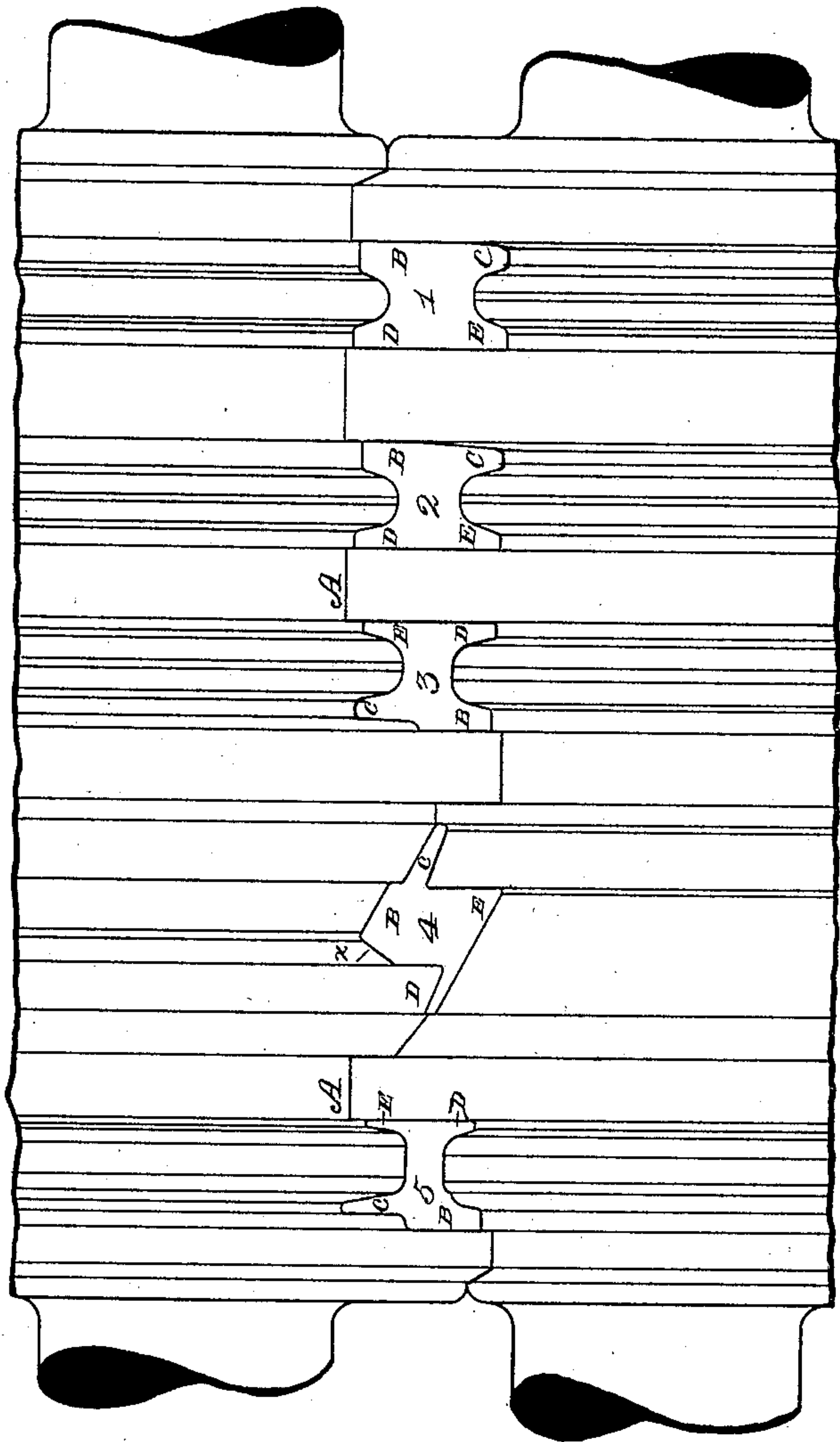
2 Sheets—Sheet 1.

F. COLLEY.  
ROLLS FOR ROLLING SIDE BEARING RAILS.

No. 410,955.

Patented Sept. 10, 1889.

Fig. 1



Witnesses:  
John H. Kennedy  
Francis P. Reilly

Inventor:  
Frederick Colley  
by P. M. Voorhees  
Atty.

(No Model.)

2 Sheets—Sheet 2.

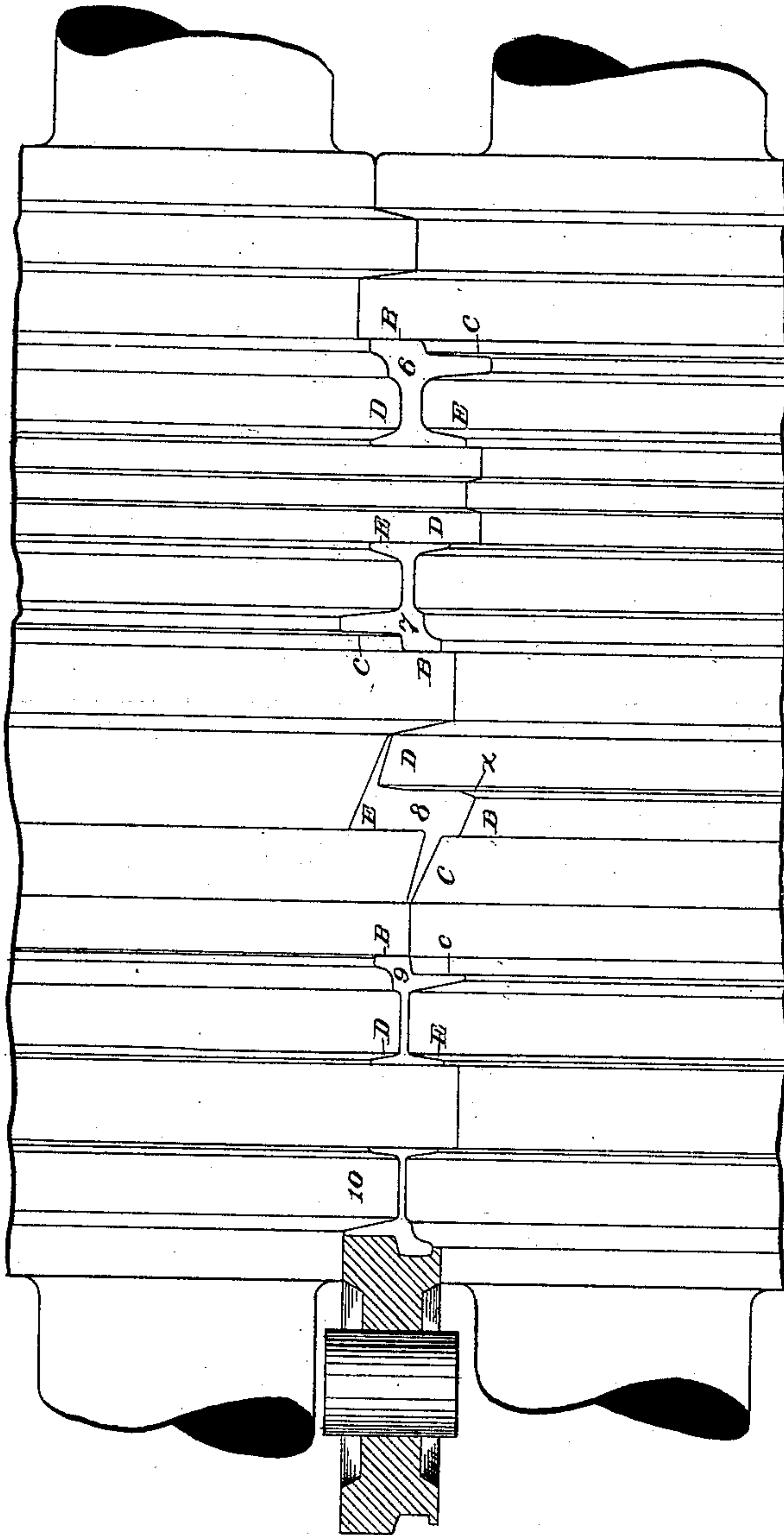
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ROLLS FOR ROLLING SIDE BEARING RAILS.

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Fig. 2



Witnesses:  
John H. Kennedy.  
Francis P. Kelly.

Inventor:  
Frederick Colley  
by R. M. Voorhees  
Att'y.



# UNITED STATES PATENT OFFICE.

FREDERICK COLLEY, OF JOHNSTOWN, PENNSYLVANIA, ASSIGNOR TO THE  
JOHNSON COMPANY, OF KENTUCKY.

## ROLLS FOR ROLLING SIDE-BEARING RAILS.

SPECIFICATION forming part of Letters Patent No. 410,955, dated September 10, 1889.

Application filed February 28, 1889. Serial No. 301,520. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK COLLEY, of Johnstown, in the county of Cambria and State of Pennsylvania, have invented a new and useful Improvement in Rolls for Rolling Side-Bearing Rails, which invention is fully set forth and illustrated in the following specification and accompanying drawings.

The object of this invention is sufficiently explained by its title.

The invention will first be described in detail, and then particularly set forth in the claims.

In the accompanying drawings, Figure 1 shows in side elevation one pair of rolls. Fig. 2 shows in similar elevation a second pair of rolls.

In said figures the several parts are indicated by reference letters and numbers, as follows: Fig. 1 contains five passes, numbered from 1 to 5, inclusive, and Fig. 2 contains the same number of passes, numbered from 6 to 10, inclusive.

The hot bloom is entered on edge into pass No. 1, after which it is consecutively passed through the various passes, being so turned from pass to pass as is demanded by the contours of the various passes, as will be readily seen from the drawings and clearly understood by those skilled in the art. The hot metal is then run through the edging-pass No. 9, whence it is, after being half turned, run through the last or finishing edging-pass No. 10. Coacting with the latter pass is shown a side roll H; but said roll may be dispensed with, and the finishing performed entirely in the pass formed by grooves of proper shape cut in the solid metal of each roll.

The passes Nos. 1, 2, and 3 are ordinary edging-passes. The oblique dummy pass No. 4 is shaped with a corner or projecting angle  $\alpha$ , the purpose of which is to thrust the upper portion of the metal B C well forward into the part of the pass marked C. The tendency of this part C, by reason of its oblique spreading action upon the metal being rolled, is to twist or thrust said metal away from it, resulting in a smaller resultant spread of metal in passing through the roll if this tendency be not checked; but such tendency is counteracted by the aforesaid action of the corner  $\alpha$ . It

will be observed that the head portion B of the metal when in pass No. 3 is wider than the space marked B in the dummy pass No. 4, and for the following reasons:

It sometimes happens that the metal in process of rolling becomes so cool as to not entirely fill the edging pass at its extreme corners. If, therefore, in such a contingency the portion B of the dummy pass No. 4 were of the same size as the portion B of the edging-pass No. 3, there would be left room for the tendency of the portion C of pass No. 4 to thrust the metal sidewise into the vacancy thus left, and thus there would be less of the metal intended for the side tram of the rail acted on, and consequent lack of width thereof. On the other hand, should the metal be at a good soft heat and well fill out the edging-pass, the result of the thrust of the metal over into the portion C of pass No. 4, caused by the action of the corner  $\alpha$ , will be that part of the metal intended for the head of the rail is cut into to form the tram of the rail and an increased width of tram thus obtained. An excess of width of metal within practicable limits can do no harm; but a deficit of metal at the point above indicated would be fatal, so that the corner  $\alpha$  in pass No. 4 coacts with the other portions of said pass to great advantage.

The operation of the oblique dummy pass No. 8 upon the metal rolled therein is identical with that just described as taking place in pass No. 4. It will be observed that the oblique passes act upon that portion of the metal D which is to form one lower flange of the rail in spreading the same simultaneously with the spreading of the portion C, which is to form the tram of the rail. There is thus secured an ample lower flange on the head side of the rail. It will also be observed that the metal of said flange of the rail always follows into the "dead side" of the succeeding pass—that is, it follows into that portion of the pass which is cut out of the solid part of the roll, as distinguished from that part located near the parting-line of the two rolls, which is called the "live part." In the live part two rolls coact to form a given portion of the metal. In the dead part only one roll does the work, as such part is cut entirely



out of one roll. All metal tends to fill out more or to "wire-draw" less from the live part than from the dead part of a pass.

In considering roll action upon metal, the very first and the last pass may generally be disregarded in their bearings upon the operation. In the first pass or two the bloom or piece of metal is too bulky to be susceptible to the minor local influences of the rolls, and in the last pass but little remains to be done, save "truing up" or finishing.

In the case of this invention in passes Nos. 3 to 9, inclusive, there are five edging and two dummy passes. As to said five edging-passes, it will be observed that where the excess of spreading action is obtained in said two dummy passes on the lower flange D said part is subsequently worked into the dead portions of the edging-passes, whereas the greater action of the live portion of the edging-passes is concentrated on the portion E, which does not and cannot in this shape get the benefit of any dummy action. For example, there is live action on the part E (one of the lower flanges of the rail) in the four passes Nos. 3, 5, 6, and 9, and dead action on the part D (the other lower flange) in the same four passes. This concentration of live action is secured without interference with the proper turning of the bloom or piece of metal to be rolled.

In the edging-passes shown, the contour of each is substantially that which the metal assumes under the action of said passes, respectively. It is, however, customary in practice to have the grooves in earlier edging-passes turned deeper than the metal is expected to fill, for the existence of such additional depth does no harm, and in many cases may be beneficial by permitting the hotter

and softer metal to fill out to its maximum at such points. The specific shaping action of these passes is governed by the shape of the metal prior to entering the pass, as well as by the shape of the operating-pass; and it is obvious that in case the metal does not fill out into all parts of the pass the resultant shape of the metal will differ somewhat from the exact contour of the pass itself.

I do not limit myself to the exact number or distribution of passes shown, as the number of passes and their distribution is, to a certain extent, arbitrary, being influenced by the length and diameter of the rolls, a light train of rolls calling for more passes with lighter draft than a heavy roll-train. It is also evident that the rolls can, if desired, be made three-high instead of two-high, as shown.

Having thus fully described my said improvement in rolls as of my invention, I claim—

1. Rolls for rolling side-bearing rails provided with an oblique dummy pass having a projecting angle or corner, as  $\alpha$ , substantially as and for the purpose described.

2. Rolls for rolling side-bearing girder-rails provided with edging-passes and oblique dummy passes, so that said edging-passes exert their live action on that part of the lower flange of the metal being rolled which is not operated on by the dummy passes, and their dead action on that portion which is operated on by said dummy passes.

3. Rolls for rolling side-bearing rails provided with passes having the respective conformations indicated by the numbers 1 to 10, inclusive.

FREDERICK COLLEY.

Witnesses:

W. McLANE,  
A. MONTGOMERY.