

(No Model.)

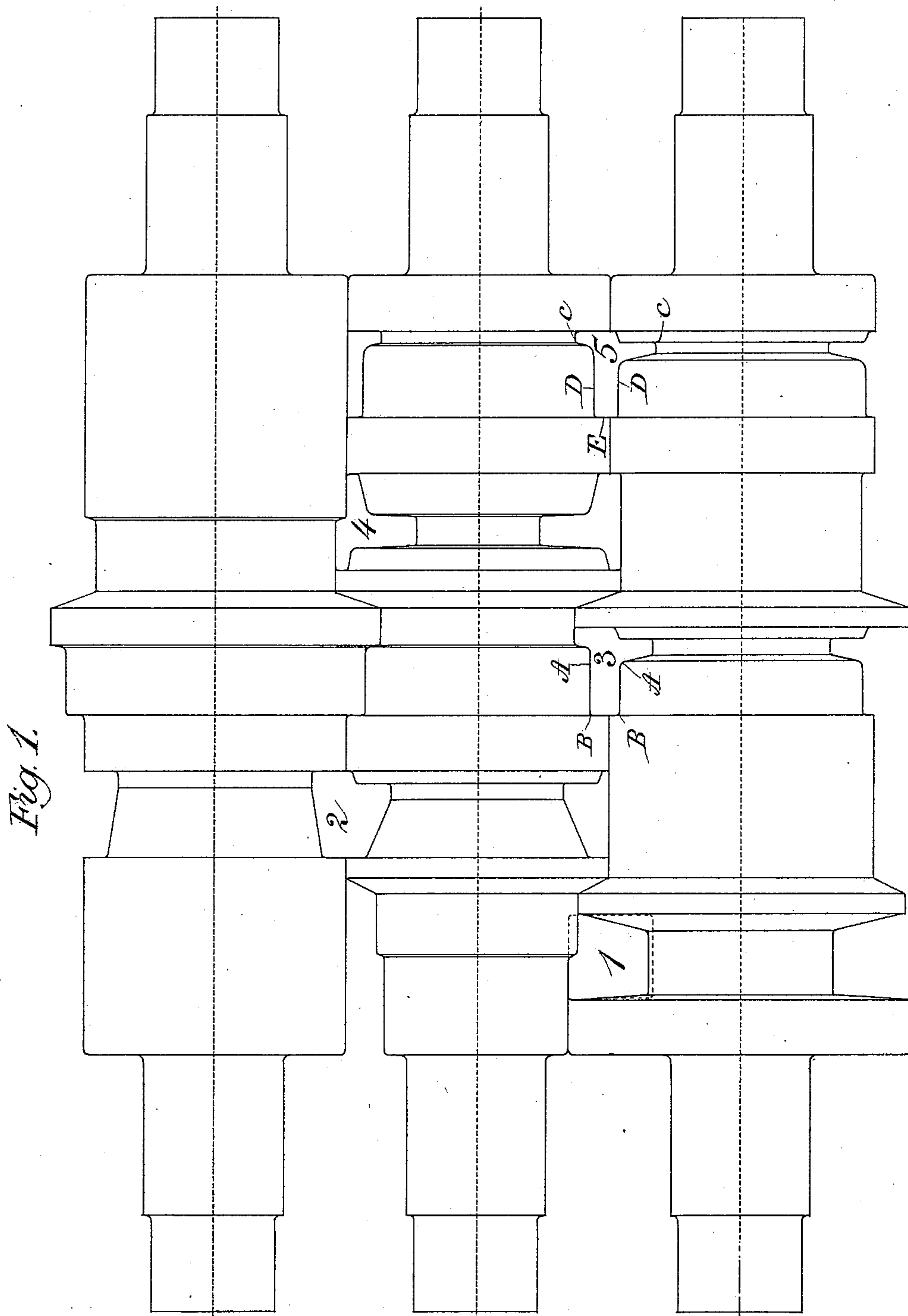
3 Sheets—Sheet 1.

A. J. MOXHAM.

ROLLS FOR ROLLING GIRDER RAILS.

No. 333,475.

Patented Dec. 29, 1885.



*Witnesses:*  
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*Att'y.*

(No Model.)

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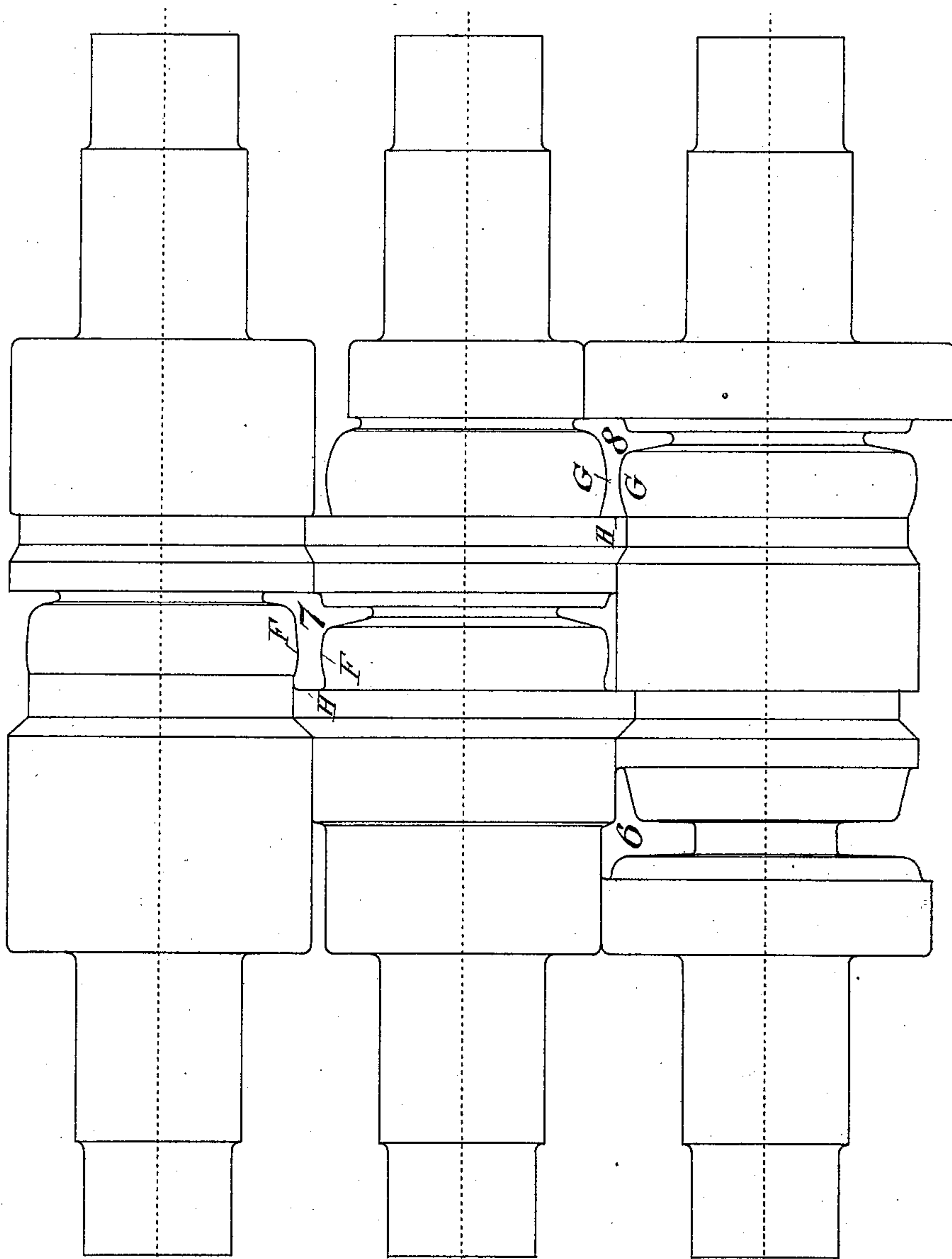
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*Fig. 2.*



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(No Model.)

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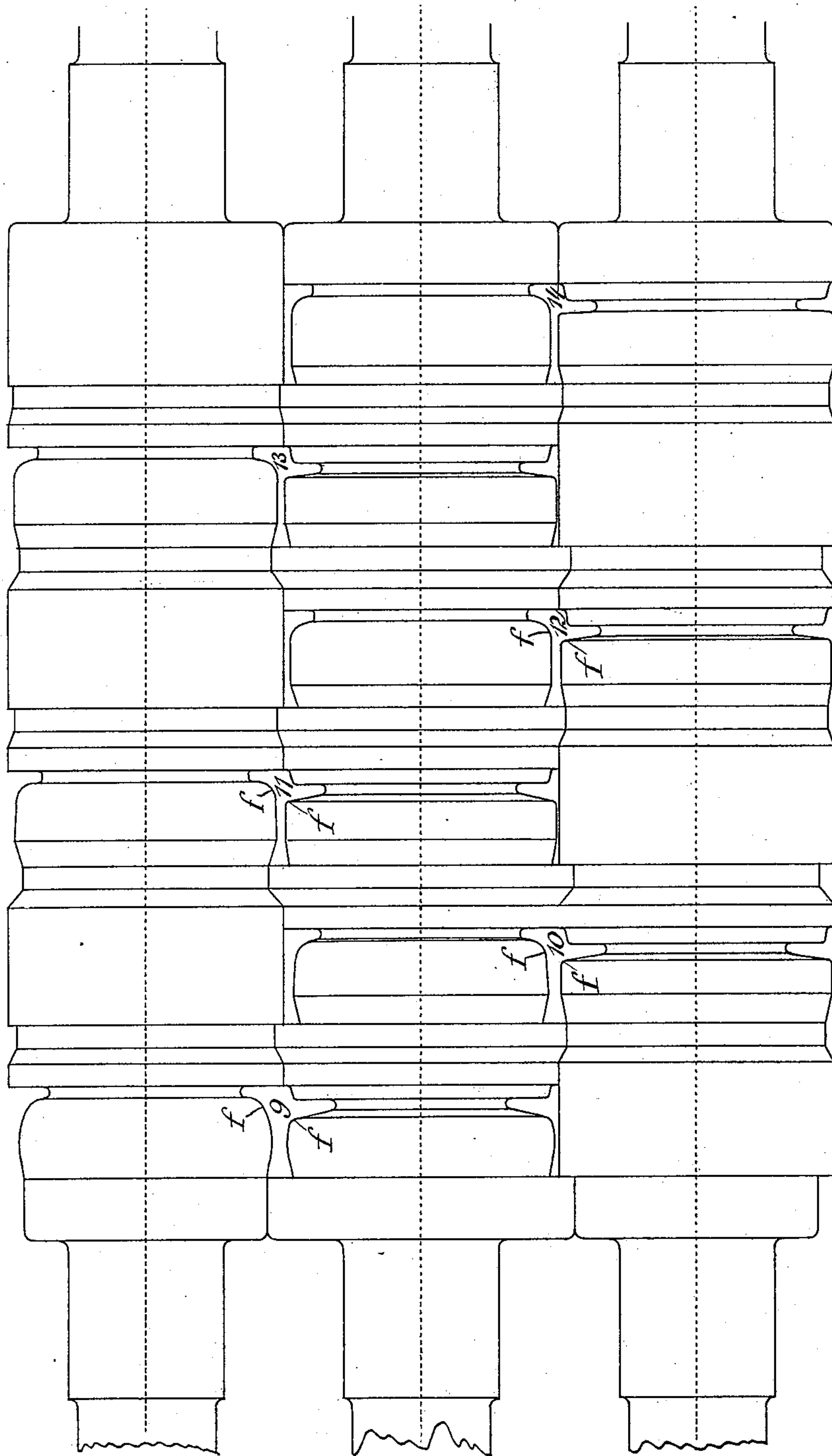
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Fig. 3.



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# UNITED STATES PATENT OFFICE.

ARTHUR J. MOXHAM, OF JOHNSTOWN, PENNSYLVANIA.

## ROLLS FOR ROLLING GIRDER-RAILS.

SPECIFICATION forming part of Letters Patent No. 333,475, dated December 29, 1885.

Application filed November 3, 1885. Serial No. 181,746. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR J. MOXHAM, of Johnstown, in the county of Cambria and State of Pennsylvania, have invented a new and useful Improvement in Rolls for Rolling Girder-Rails, which improvement or invention is fully set forth and illustrated in the following specification and accompanying drawings.

The object of this invention is to roll, in rolling-mill rolls, a girder-rail devoid of lower flanges, but provided with a beveled-footed web; and the invention consists of certain rolls provided with specially-formed passes for such purpose.

In the accompanying drawings, Figure 1 shows, in front elevation, a pair of roughing-rolls "three-high." Fig. 2 shows, in like elevation, a second pair of roughing-rolls three-high. Fig. 3 shows, in similar elevation, a pair of finishing-rolls, also three-high.

The first of said figures contains five "passes"—one "dummy" or flattening pass (No. 4) and four edging-passes. The second contains three passes—two edging and one dummy pass, (No. 6.) The third contains six passes—all edging-passes—making a total number of fourteen passes. A hot bloom, having a cross-section about like the space included within the dotted lines at pass No. 1, being entered into said pass and rolled therethrough, is next run on edge into and through pass No. 2, thence on edge into and through pass No. 3, thence on the flat through the dummy-pass No. 4, thence on edge through No. 5, thence on the flat through the dummy-pass No. 6, thence on edge through No. 7, and thence, successively, on edge through all the remaining passes, ending with No. 14.

In passes Nos. 1 and 2 more work is done on one side of the metal than on the other, because while the bloom is heavy or of large body it is less susceptible to variation in work than in the later passes, when nearer to finished shape.

In pass No. 3 excess of work is put on the upper part of the web A A and much less on the extreme end B B of the same, the object being to have an ample body of metal at the extreme end to form the wedge or beveled lower part of the web in the finished rail. It is of advantage to thus localize the greatest

reductions in the earlier passes, so long as the mass of metal left is large enough by its inertia and cohesion to enable it to resist too great distortion that would otherwise ensue.

Pass No. 4, being a dummy-pass, widens out the whole head part of the metal and reduces its thickness, by which spreading enough width is secured to put sufficient draft on the points *c c*, in the next (edging) pass, No. 5, to correspond with a quick reduction at D D of the web portion. The reduction at D D is facilitated by leaving room enough for the flow of metal sidewise to the point E, under which action the web part is subjected to elongation as well as displacement.

In passes Nos. 6 and 7 the same operations and principles are carried out as in passes Nos. 4 and 5.

In passes Nos. 7 and 8 the reduction and partial formation of the lower wedge or beveled foot are simultaneously effected by putting excess of work upon the center of the web at F F in pass No. 7 and at G G in pass No. 8, while again providing freedom for flow of metal at the points H and H.

In passes Nos. 9 to 12 the heaviest draft is on the two extremes of the head, together with side draft on the head, including with the head proper the side tram also. The distribution of draft on the web is such that it is lighter on the central portion and on the beveled end and heavier at the shoulders, where it adjoins the head.

It is found in rolling all rails without lower flanges that great trouble is incurred in securing a flow of metal in the head part to keep up with that of the metal in the web part. It is frequently the case that the tendency of the web to run away from the head is evidenced by corrugations in the web. As the metal is rigidly held at the head part, any excess of flow in the metal of the web part can only find its path in such corrugations. This tendency to corrugation is obviated by shaping the passes so as to cause the distribution of work and draft above described—that is, there is induced or caused a flow of metal at the point of junction of head and web, (by heavy draft,) while such flow at the other extreme end is checked by providing for displacement of metal there, and at the same time causing the

metal in the head, as an entirety, to flow, by heavy draft, with that in the web whose flow has been thus equalized.

5 In the finishing-passes, Nos. 9 to 14, the web is gradually and uniformly reduced and the head formed true to its finished shape, the variation or irregularity of draft being of finer adjustment and more uniform distribution than in the preceding passes.

o The main features of this invention are thus seen to be the localizing of excessive irregular draft in the earlier passes, rapid reduction at the central points of the webs, with provision for displacement of part of the portion so  
5 acted on to form the beveled foot in the intermediate passes, and heavy draft on the under part of the shoulders of the head in the earlier of the finishing-passes, together with lighten-

ing of draft at the extreme beveled end. The provisions thus made permit of great nicety 20 of adjustment or flow of metal between the leading pass No. 13 and the final finishing-pass No. 14.

Having thus fully described my said improvement in rolls, as of my invention I 25 claim—

A set of rolls for rolling girder-rails devoid of lower flanges, provided with passes of the respective shapes shown in the accompanying drawings, and therein numbered from 1 to 14, 30 inclusive, substantially as described, for the purposes set forth.

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