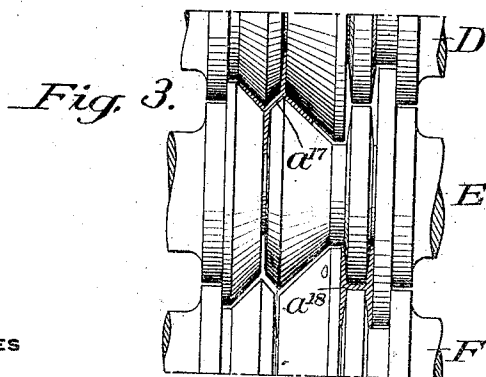
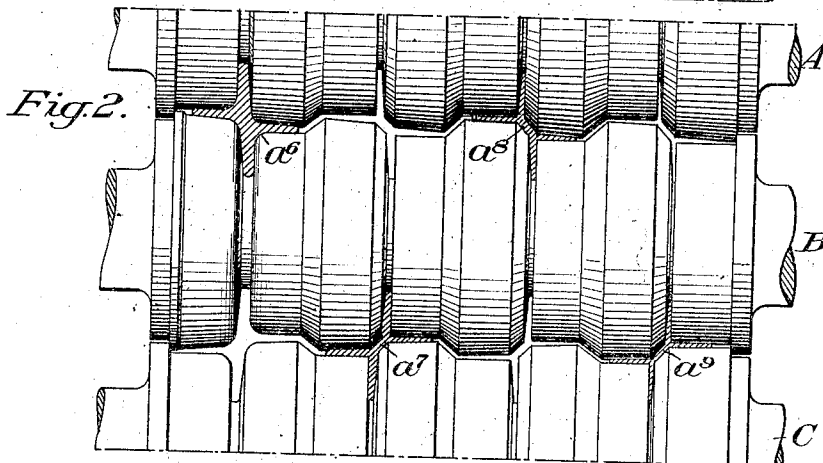
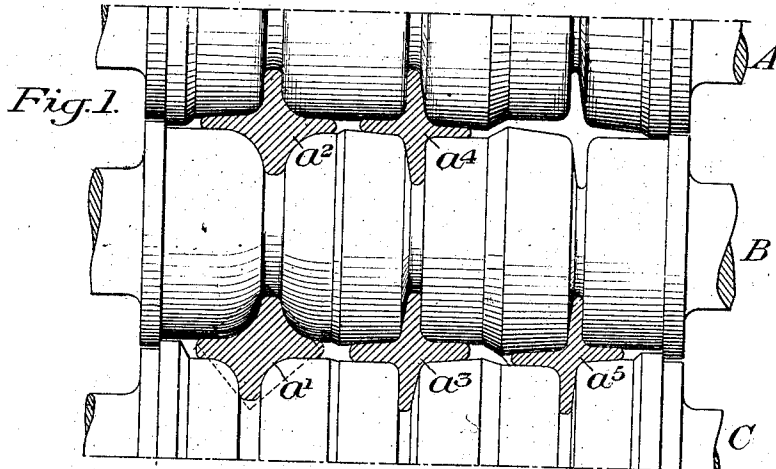


G. H. BARBOUR.
METHOD OF ROLLING FLANGED SECTIONS.
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Patented Nov. 25, 1913.



WITNESSES

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UNITED STATES PATENT OFFICE.

GEORGE H. BARBOUR, OF PITTSBURGH, PENNSYLVANIA.

METHOD OF ROLLING FLANGED SECTIONS.

1 029,739.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE H. BARBOUR, of Pittsburgh, Allegheny county, and State of Pennsylvania, have invented a new and useful Method of Rolling Flanged Sections, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figures 1, 2 and 3 are front views of portions of three-high mills for rolling flanged sections.

My invention relates to an improved method of rolling sections having a plurality of flanges extending from one or both ends of the web. By my improved method, I am enabled to roll sections having a greater flange width in proportion to the thickness and at the same time retain the flanges at approximately the same angle with relation to the web throughout the entire reducing process. I accomplish this by first forming a star-shaped blank in which the diagonal dimensions over all are not less than the diagonal over-all dimensions of the finished section. This star-shaped blank may be formed in any manner, but I prefer to shape it from a rectangular blank and immediately form the full width of the flanges and the full height of the web.

The precise nature of my invention will be best understood by reference to the accompanying drawings, which will now be described, it being premised, however, that various changes may be made in the details of construction and general arrangement of the apparatus for carrying out my method, without departing from the spirit and scope of my invention as defined in the appended claims.

In Figs. 1 and 2 of the drawings, A, B, and C designate the rolls of a three-high mill for rolling a flanged section having oppositely extending flanges at each end of the web. A square or star-shaped billet is first passed between the rolls B and C, as indicated at a^1 . After passing through this pass, it is turned 90 degrees and passed between rolls A and B, as indicated at a^2 ; it is again turned 90 degrees and passed through the pass a^3 between the rolls B and C, and so on through the successive passes a^4 to a^9 . The web is formed at an angle of 45 degrees to the axes of the rolls, one pair of alternate flanges occupies positions at right angles to the axes of the rolls, while the other pair of

alternate flanges occupies positions parallel to the axes of the rolls; the flanges occupying vertical positions in one pass will occupy horizontal positions when in the next pass, and vice versa.

In Fig. 3, D, E, and F designate the rolls of a three-high mill for finishing the I-beam. The section is first passed through a pass indicated at a^{17} , between rolls D and E, where one pair of alternate flanges is bent at right angles to the web and is then run through the pass a^{18} , between the rolls E and F, where the other pair of alternate flanges is bent at right angles to the web to form the I-beam section. I have shown the I-beam section as being formed in eleven passes in a three-high mill, but it will readily be understood by those familiar with the art that the reduction might be made in more or less passes, and that it also might be made in a two-high mill; the number of passes being arranged in accordance with the section to be produced.

When rolling I-beams, such as shown at a^{18} in Fig. 3, I may start with a blank, such as shown at a^3 in Fig. 1, or I may form this blank by passing a blank, such as shown in dotted lines at a^1 through the passes a^1 , a^2 , and a^3 , but in all cases, I desire to form the article from a blank in which the over-all cross-sectional dimensions are as great or greater than the over-all cross-sectional dimensions of the finished article. By an inspection of the blank shown at a^3 in Fig. 1, it will readily be seen that the diagonal dimension across the oppositely disposed projections is as great as the diagonal dimension across the roll section shown at a^3 , which is the last reducing pass, and that the web height of the blank shown at a^3 is not less than the height of the web shown at a^9 . The blank shown at a^3 is first passed through rolls A and B at a^4 to reduce the thickness of the pair of alternate flanges, which are approximately parallel with the axis of the rolls, without materially changing the thickness of the web. I then turn the blank 90 degrees and pass it between the rolls B and C, as indicated at a^5 to reduce the thickness of the opposite flanges and still maintain a large body of metal in the web. The blank is then put through the successive passes a^6 , a^7 , a^8 and a^9 to gradually reduce the thickness of the flanges and web. By immediately arranging the longitudinal fibers throughout the width of the

flanges and the height of the web, while there is a large body of metal in these portions, I am enabled to properly arrange them while the metal is hottest and by reducing the thickness of the flanges before materially reducing the thickness of the web, I am enabled to form the flanges while there is still a large body of hot metal in the web, and by then simultaneously reducing the thickness of the web and flanges, the fibers will be properly arranged and brought closely to their final positions in the cross section, before the critical temperature period has been reached.

The advantages of my invention result from the provision of a method of rolling flanged shapes, in which the full width of the flanges and the height of the web are formed while there is a large body of metal in the flanges and web, whereby the fibers are brought closely to their final position in the cross section before the critical temperature period has been reached.

I claim:

1. The method of shaping in a plurality of roll passes a metal section having a web and a plurality of flanges extending from one end thereof, consisting in applying pressure to one flange and the web in the first pass to form the full width of the flange and the full height of the web, then applying pressure to the other flange and the web in the second roll pass to form the full width of said flange, and then reducing the thickness of the flanges and web in subsequent roll passes without materially changing the width of the flanges and the height of the web; substantially as described.

2. The method of shaping in a plurality

of roll passes a metal section having a web of roll passes a metal section having a web and a plurality of flanges extending from each end of the web, consisting in applying pressure to oppositely disposed flanges and the web in the first pass to form the full width of the flanges and the height of the web, then applying pressure to the other flanges and the web in a second roll pass to form the full width of the flanges, and then reducing the thickness of the flanges and the web in subsequent roll passes without materially changing the width of the flanges and the height of the web; substantially as described.

3. The method of forming an I-beam which consists in providing a blank having a central web and flanges extending at substantially 90 degrees with relation to each other from each end of the web, then passing the work piece through alternate passes to apply pressure to one flange at each end of the web and simultaneously apply pressure to the web without materially changing the angular relation between the flanges and the web, or without materially changing the width of the flanges and the height of the web, and then changing the angular relation between the web and the flanges so that said flanges will extend at right angles to the web; substantially as described.

In testimony whereof, I have hereunto set my hand.

GEORGE H. BARBOUR.

Witnesses:

JESSE B. HELLER,
H. M. CORWIN.