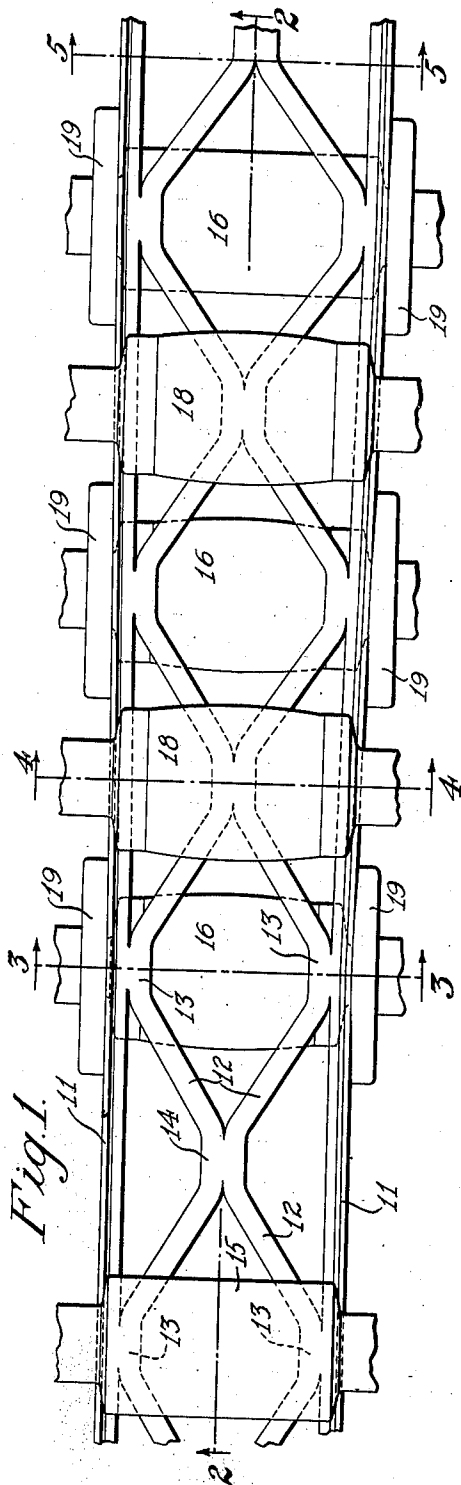
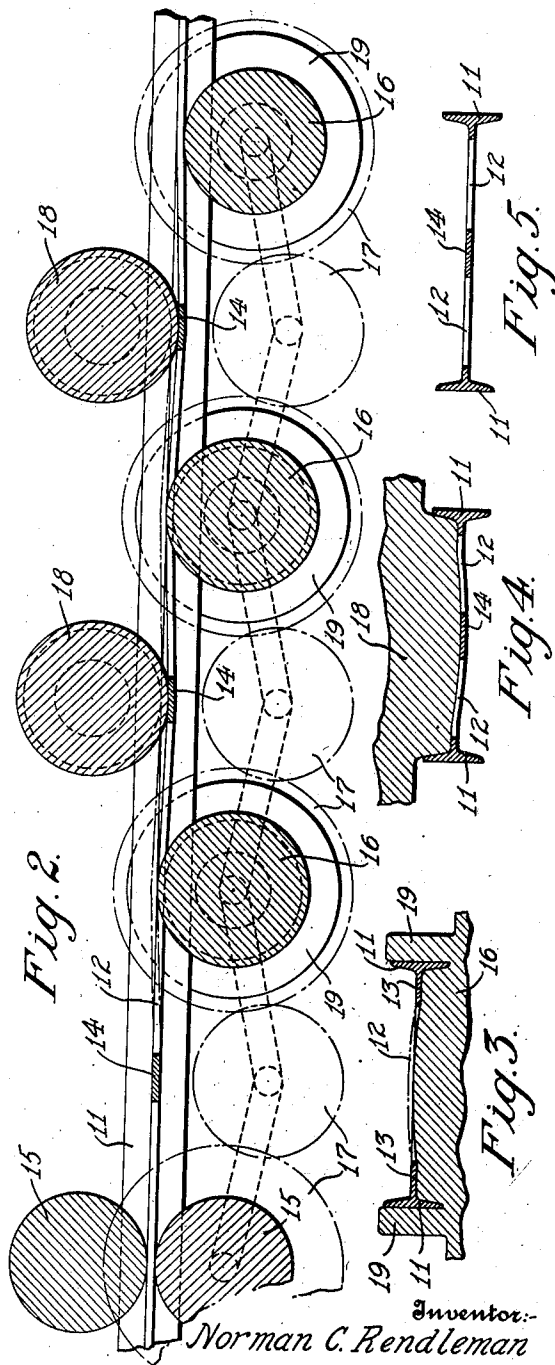


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N. C. RENDLEMAN
STRUCTURAL ELEMENT MANUFACTURE

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STRUCTURAL-ELEMENT MANUFACTURE.

Application filed March 8, 1922. Serial No. 542,054.

To all whom it may concern:

Be it known that NORMAN C. RENDLEMAN, a citizen of the United States, and resident of Dormont, in the county of Allegheny, State of Pennsylvania, has invented an Improvement in Structural-Element Manufacture, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

My invention aims to improve the manufacture of latticed structural elements and to perfect the products, such as beams, columns, girders, roof and bridge trusses, and other load carrying members having latticed, trussed or open work webs between their marginal flanges.

In the accompanying drawings, wherein I have shown one embodiment or practice of my invention for purposes of illustration, Fig. 1 is a plan view of a preferred form of expanding and straightening machine, showing one type of product in process of manufacture;

Fig. 2 is a longitudinal mid-section of the same on the line 2—2 in Fig. 1;

Fig. 3 is a fragmentary transverse section of the same on the line 3—3 in Fig. 1;

Fig. 4 is a similar view on the line 4—4 in Fig. 1; and

Fig. 5 is a cross-section of the finished product.

In the particular embodiment of my invention selected for illustration herein and shown in the drawings, referring particularly to Figs. 1 and 2, the material to be operated on is a latticed I-beam consisting of side flanges 11 connected by an open work web of zigzag or inclined strips or ties 12 joined to the flanges by bonds 13 and to each other by bonds 14 on the mid-line of the beam. The material is advantageously taken direct from the flattening operation of the expanding machine in its partly cooled condition and finished while still warm.

The beam is fed by means of suitable rolls 15 over and under a series of staggered rolls which may have slightly convex middle portions bearing upon the web members to flex them alternately up and down. The bottom rolls 16 are all driven at uniform speed from the rolls 15 or other source of power by suitable gearing 17. The top rolls 18 are preferably driven by frictional contact with

the beam, which is guided between the rolls 55 by grooves and collars 19 preferably on the bottom rolls. The successive rolls are each slightly wider than the preceding one to gradually separate the flanges 11 and widen the beam as it passes through.

The rolls 16, 18, are adjustable longitudinally of the direction of travel of the beam to space them at intervals corresponding to the distances between the bonds 13, 14, and the gearing 17 may likewise be adjusted to suit the spacing of the rolls, so that different sectional shapes of beams and various forms and sizes of lattice work may be made by suitably shaping and adjusting the rolls.

The operation is as follows:

Referring particularly to Figs. 2, 3 and 4, the beam or other element is guided by its marginal flanges between the feeding rolls 15 and over the bottom rolls 16, the grooves of which support the flanges 11 in a horizontal plane. The top rolls are adjusted in their housings to bear down on and maintain the horizontal alinement of the flanges 11. The enlarged middle portions of the rolls cause the strips or ties 12 and the successive bonds 14 to bend up and down alternately as the beam passes through, thereby pulling on them slightly to straighten out any irregularities, twists, bends or buckles left by the earlier fabricating operations.

This is illustrated in Figs. 2 and 3, wherein the element is shown in full lines in its condition when the bonds 14 are under the top rolls and in dot and dash lines when the bonds 14 are over the bottom rolls. The slight increase in the effective length of the members 12 is compensated for by the slight increase in the distance between the flanges 11 caused by the additional length of each successive roll, as shown in Fig. 1.

It is evident that the pulling operation may be continued to the point of actually stretching the metal of the web members 12 if it is desired to obtain a greater lateral expansion of the web.

My invention obviously is not restricted to the particular embodiment and practice thereof herein illustrated and described.

Having disclosed one illustrative embodiment of my invention, what I claim and desire to secure by Letters Patent is as follows:

1. In the manufacture of structural ele-

ments having continuous sides and angularly disposed web members connecting the sides, means for maintaining said sides in alinement and deflecting longitudinally separate portions of said web members out of the plane of alinement of said sides to pull them straight.

2. In the manufacture of structural elements having continuous sides and angularly disposed web members connecting the sides, means for maintaining said sides in diverging horizontal alinement and deflecting longitudinally separated portions of said web members out of the plane of alinement of said sides to pull them straight, whereby the further separation of said sides may be effected.

3. The process of manufacturing latticed structural elements comprising side members and angularly disposed web members connected to said side members at regularly spaced intervals which includes successively gripping said web members simultaneously at their points of connection and midway therebetween and deflecting them from the plane of the web to straighten their intervening portions.

4. The process of manufacturing latticed structural elements comprising side members and angularly disposed web members connected to said side members at regularly spaced intervals which includes successively gripping said web members simultaneously at their points of connection and midway therebetween and deflecting them alternately to opposite sides from the plane of the web to straighten their intervening portions.

5. The process of manufacturing latticed structural elements comprising side members and angularly disposed web members connected to said side members at regularly spaced intervals which includes successively gripping said web members simultaneously at their points of connection and midway therebetween and deflecting them from the plane of the web to straighten their intervening portions while gradually separating said side members.

6. In the manufacture of latticed structural elements, straightening means for the web members comprising top and bottom

rolls in alternation at spaced intervals corresponding to the distance between the ends and crossing points of the web members, said rolls being slightly convex to bend the middle points of the respective web members out of line with their ends to pull them straight, and means for guiding the side members past said rolls in slightly divergent paths to maintain said web members taut as they are straightened.

7. In the manufacture of latticed structural elements, straightening means for the web members comprising top and bottom rolls in alternation at spaced intervals corresponding to the distance between the ends and crossing points of the web members, said rolls being slightly convex to bend the middle points of the respective web members out of line with their ends to pull them straight, and means to maintain said web members taut as they are straightened.

8. A finishing step in the manufacture of structural elements, having side members and a connecting web comprising inclined crosswise members which includes passing the element through a series of straightening rolls operating in alternation upon opposite sides of the respective web members while guiding the side members in divergent paths.

9. The process of finishing latticed structural elements having continuous marginal flanges and slitted and expanded web members integral therewith by subjecting the expanded web members to successive bending alternately in opposite directions with respect to the margins while maintaining the latter in their spaced relation in the principal plane of the element for pulling said web members free from irregularities.

10. The process of finishing latticed structural elements having slitted and expanded web members by subjecting the expanded web members to successive bending alternately in opposite directions with respect to the principal plane of the element for pulling them free from irregularities, and separating the side members to accommodate the increased length of the web members.

In testimony whereof, I have signed my name to this specification.

NORMAN C. RENDLEMAN.