W. A. DUNN.

ROLLING MILL.

APPLICATION FILED AUG. 14, 1914.

1,156,986. Patented Oct. 19, 1915.

Fig. 4.

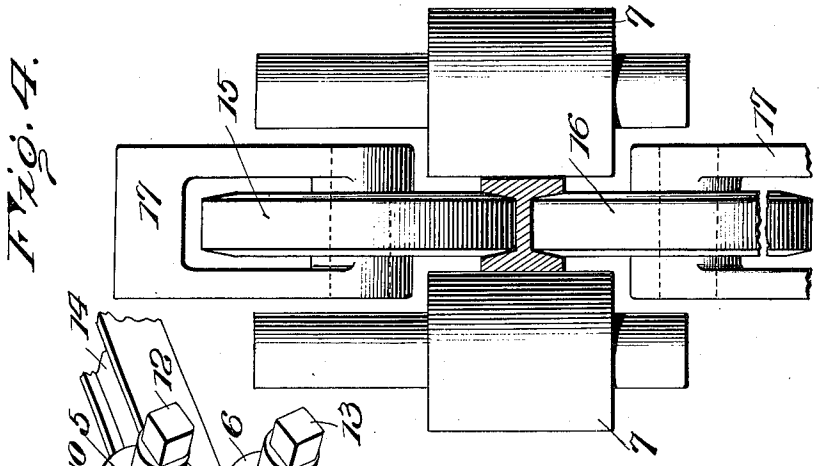


Fig. 1.

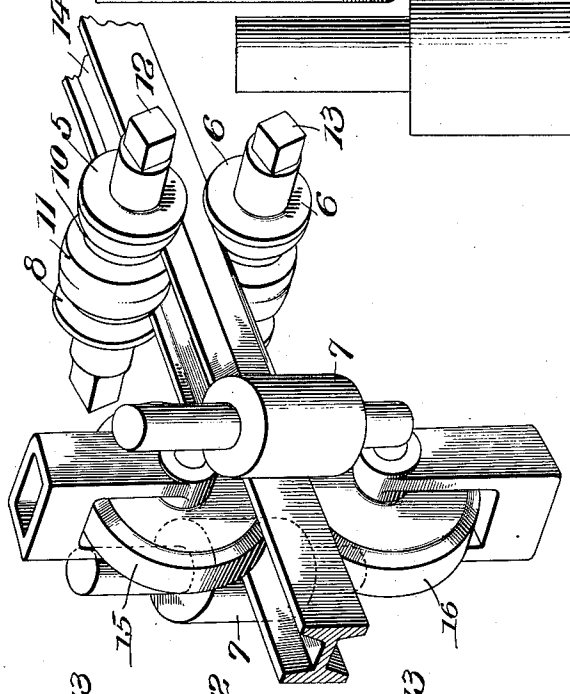


Fig. 3.

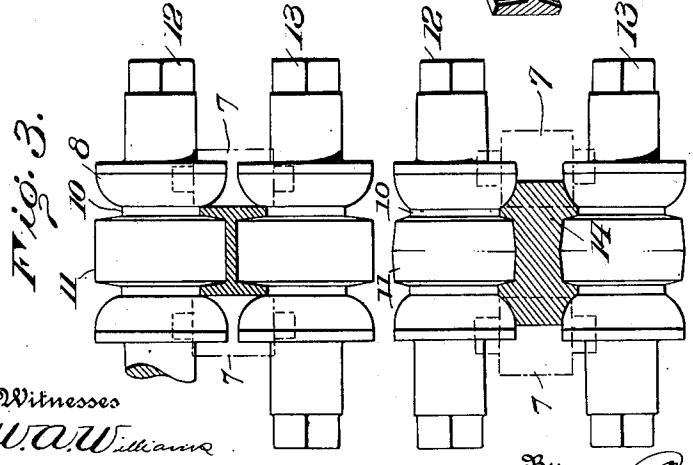


Fig. 2.

Witnesses

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UNITED STATES PATENT OFFICE.

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ROLLING-MILL.

1,156,986. Specification of Letters Patent. Patented Oct. 19, 1915.

Application filed August 14, 1914. Serial No. 856,788.

To all whom it may concern:

Be it known that I, WILLIAM A. DUNN, a citizen of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Rolling-Mills, of which the following is a specification.

This invention relates to improvements in rolling mills primarily designed for shaping structural iron beams of various types, and more specifically to certain improvements in the type of mill illustrated and described in my prior Patents No. 709,080, September 16, 1902, and No. 1,002,906, September 12, 1911.

One of the objects of the present invention is to provide a simple and practical rolling mill of the above character which will be more efficient in use and reliable in operation.

A further object is to provide a mill in which the parts are so constructed and arranged as to produce a more desirable finished blank.

Other objects will be in part obvious and in part hereinafter explained.

The present invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the device hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing wherein is shown one of various possible embodiments of the present invention: Figure 1 is a diagrammatic perspective view showing the rolls in their relative operative position. Fig. 2 is a side elevation of a set of horizontal shaping rolls showing the ingot in the rough in the first stage of the forming of an I beam blank. Fig. 3 is a view similar to Fig. 2, but illustrating the last pass of the ingot, the latter having been shaped to form an I beam blank. Fig. 4 is an elevation of a set of horizontal supporting and guide rolls, showing their relation to the vertical side gaging rolls.

Similar reference characters denote corresponding parts in the different views.

Referring now to the drawing in detail and more particularly to Fig. 1, in which certain parts, such as the frame work and means for moving the adjusting rolls relatively to one another are omitted, the same being fully shown in Figs. 1 and 2 of my prior Patent No. 1,002,906, above mentioned, 5 and 6 denote the upper and lower shaping rolls respectively, through which a slab or ingot is passed. These rolls, as shown in Fig. 2, are similar in shape when used for producing what is usually referred to as an I-beam, although one of them preferably the upper pressure roll, may be changed somewhat in contour when used for producing channel beams, for example. The principal point of distinction between these rolls and those shown in my prior patent resides in the fact that the sides of the rolls on that portion used in forming the flanges to the beams are curved, as shown, instead of being conically inclined as heretofore. By means of this structure, when coöperating with the vertically disposed side gaging rolls 7, the metal forming the flanges is compressed more homogeneously and is more efficiently forced into compact relation with respect to the web of the beam. The curvature of the rolls, acting through the curved portion 8, serves to crowd the metal into the flanged groove 10 at each side of the body portion 11 of the roll.

It is, of course, to be understood that the upper or pressure roll 5, by means of its supporting shaft 12 is adjustable toward and from the lower or supporting roll 6 on shaft 13, and thereby determines the thickness of the web and the depth of the flange, and likewise the vertically disposed side gaging rolls 7 at each side of the ingot may be moved toward and from the path of travel of the ingot to reduce the width of the ingot to a predetermined dimension as it passes through the mill.

After the ingot 14 has passed through the shaping rolls 5 and 6 it is fed to the second set of horizontally disposed solid bearing rollers 15 and 16, which may be termed shape preserving rollers as distinguished from shape forming rollers as applied to the work of comparatively large diameter, as shown more clearly in Fig. 4. This set comprises an upper and guide roller 15 and a lower supporting roller 16, which run upon the entire width of the web between the flanges, supporting the latter and resisting pressure upon the same and the tendency to buckle due to the pressure of the side gaging rolls operating upon the outside of the flange the function being to preserve the shape of the beam.

It will be clear that the solid support

rollers 15 and 16 offer a uniform contact with the surface of the web of the ingot, in such manner that buckling is prevented, overcoming this somewhat objectionable feature present in the operation of my former patents hereinbefore mentioned. It is understood that the bearing rollers 15 and 16, with their U-shaped carriers 17, are movable toward and from each other and that they operate with their axes in the same vertical plane as the vertical side gaging rolls 7—7.

It is thought that the method of use and operation of a rolling mill of this character is sufficiently well known to those familiar with the art to make a detailed description thereof unnecessary. It is sufficient to state that the ingot is fed through the rolls 5 and 6 and between the vertically disposed side rolls 7 and the horizontally disposed bearing rollers 15 and 16. This is successively done, adjusting the rolls either manually or automatically, as desired, as indicated by Figs. 2 and 3, until the beam blank is finished to the desired dimensions and ready for treatment in the finishing mills, which latter operation forms no part of my present invention. The form of the rolls will crowd the metal into the flanges with sufficient force to produce the required size and shape and make the flanges more homogeneous than has been done heretofore.

It is thus seen that the present invention comprises a simple and practical device adapted to accomplish, among others, all of the objects and advantages above set forth.

As many changes could be made in the above construction and many apparently widely different embodiments of my invention could be made without departing from the scope thereof, I intend that all matter contained in the above description or shown in the accompanying drawings, shall be termed as illustrative and that the appended claims shall be construed as broadly as is warranted by the state of the art.

What I claim is:

1. In a rolling mill, in combination, a pair of superposed rolls, a pair of vertically disposed side gaging rolls, said first mentioned rolls being provided with grooves formed with flanges and longitudinally curved portions adjacent the grooves adapted to crowd the metal into the flange groove.

2. In a rolling mill, in combination, a pair of superposed rolls, one of said rolls having a flange groove, one side of which is convexly curved in the direction of its length to crowd the metal into said flange groove.

3. In a rolling mill, in combination, a pair of grooved rolls, each of said rolls having an outside curved portion adapted to force the metal into the grooves as the ingot is fed therethrough, a second pair of horizontally disposed rollers adapted to work between the flanges formed by the grooved rolls, said last mentioned horizontally disposed rollers being relatively narrow and U-shaped frames for said last mentioned rollers.

4. In a rolling mill, in combination, a pair of grooved rolls, each of said rolls having an outside curved portion adapted to force the metal into the grooves as the ingot is fed therethrough, and a second pair of horizontally disposed rollers, same being relatively narrow, U-shaped carrying frames therefor, vertically disposed side gaging rolls adapted to coact with the sides of the ingot as it is passed through the last mentioned pair of horizontally disposed rollers, to force the metal closely against the sides of said rollers and form the flanges on the beam.

5. In a rolling mill of the character described, in combination, horizontally disposed shaping rolls provided with grooves formed with flanges the portions adjacent the grooves being of curved contour to force the outer edge of the ingot into the grooves, a second set of horizontally disposed solid tread rollers superposed with relation to each other and journaled within carriers.

6. In a rolling mill of the class described, in combination, horizontally disposed beam shaping rolls, vertical rolls adapted to work on the flanges of the beam to reduce the side edges of the ingot, and solid friction driven pressure resisting and shape preserving rollers adapted to prevent buckling of the web and flanges by the pressure of the vertically disposed rolls while the beam shape is being formed from the ingot.

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

WILLIAM A. DUNN.

Witnesses:
ANDREW C. DUNN,
F. P. AMO.