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METHOD AND MEANS FOR SHAPING ROLLS AND THE LIKE.

APPLICATION FILED JULY 6, 1914.

1,338,178. **Patented Apr. 27, 1920.**

Fig. 1.

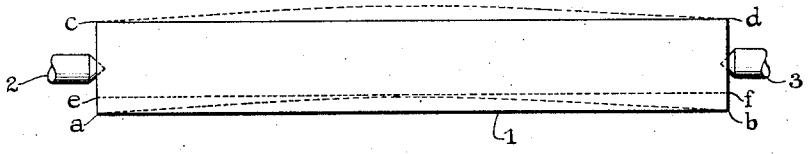


Fig. 2.

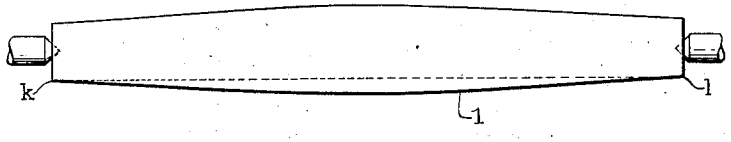
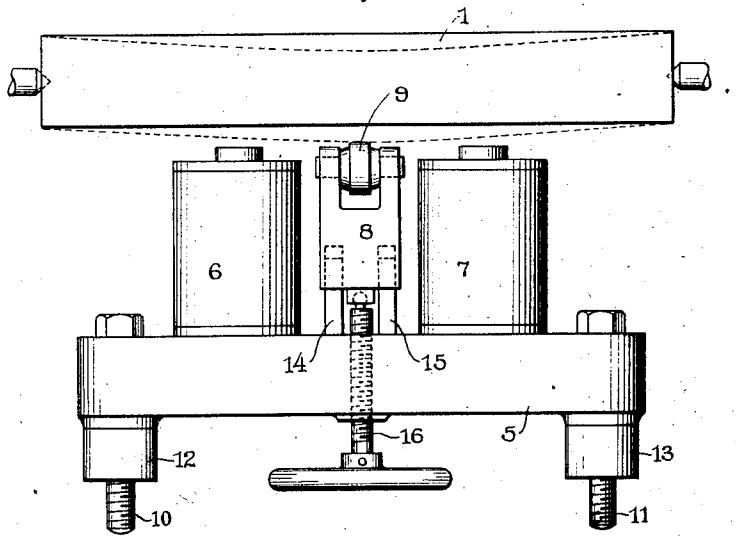


Fig. 3.



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METHOD AND MEANS FOR SHAPING ROLLS AND THE LIKE.

1,338,178. Specification of Letters Patent. **Patented Apr. 27, 1920.**

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To all whom it may concern:

Be it known that I, CLARK T. HENDERSON, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Methods of and Means for Shaping Rolls and the like, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

This invention relates to a method of and means for curving surfaces of yielding bodies.

While the invention is susceptible of advantageous use in various relations it is particularly useful in shaping mill rolls. As is well understood, if a flat body be passed between mill rolls of true cylindrical form, said rolls will bow and to a degree vary with the pressure, etc. Thus, where a flat surface of the rolled material is desired, it is the practice to grind the rolls to produce a longitudinal convexity of the working surfaces thereof to compensate for the distortion of the same in use. Heretofore, however, much difficulty has been experienced in ascertaining the proper curve and in grinding the rolls to produce the curve selected.

The present invention aims to eliminate such difficulties, and, as will hereinafter appear, enables rolls of the aforesaid character, and various other bodies, to be readily and accurately curved as desired.

In order to more fully and clearly disclose the nature and advantages of the invention reference will be made to the accompanying drawing, in which,

Figures 1 and 2 are schematic views for reference in explaining the aforesaid method; and,

Fig. 3 schematically illustrates one form of means for carrying out the aforesaid method.

Briefly set forth, the method herein proposed consists in bowing or distorting the body to be shaped, and then grinding or otherwise working the bowed surface thereof along a straight line. Then the body is permitted to resume normal form and in so doing assumes a surface curvature corresponding in degree to that produced by distortion but of a negative character. For example, if the body be ground upon a concave surface the resultant curvature will be convex, while if the body be ground upon a convex surface the resultant curvature will be concave.

The method will now be more specifically described in the application to the shaping of mill rolls, reference being made to the accompanying drawing.

Referring to Fig. 1, the same shows in full lines a roll 1 of true cylindrical form revolubly mounted upon concentric supports 2 and 3. The solid line between points *a* and *b* represents the working surface of the roll and it will be assumed that in use the roll would be distorted to the extent indicated by the dotted line between points *a* and *b*, this curvature being exaggerated for illustration. Thus for grinding purposes the roll would be distorted, as shown by dotted lines *a*—*b* and *c*—*d*. Then the roll would be revolved about its distorted axis and its concave surface ground along a line parallel to its true axis and in the plane of maximum distortion. Then when the roll was ground to the desired degree, represented by the dotted line *e*—*f*, and released to resume normal form its surface would be uniformly convex as shown in Fig. 2. Moreover, the degree of convexity of its surface would equal the degree of distortion thereof so that in actual use its working surface would flatten out as indicated by the straight dotted line *k*—*l*, Fig. 2.

Thus the simplicity and ease with which the roll may be shaped will at once be apparent. Further, it will be observed that determination of the ultimate curvature by distortion of the roll is far more reliable and accurate than by ordinary methods and only requires a knowledge of the maximum radial distortion at the axial center of the roll.

Referring now to Fig. 3, the same shows means for distorting the roll as indicated in Fig. 1. This means includes an electromagnetic frame 5 carrying two electromagnets 6 and 7 and an intermediate bracket 8 having in the end thereof a roller 9.

The aforesaid means is arranged adjacent to the roll 1 with the roller 9 substantially midway between the ends of said roll 1 and at a distance from the surface thereof corresponding to the desired curvature,

Thus when the magnets 6 and 7 are energized they attract the roll 1 against the roller 9 bowing the same, as indicated by dotted lines. The roll 1 being thus magnetically held against the roller 9, will, when revolved, turn about its distorted axis with its concave surface freely accessible for grinding, as above described. The roller 9, although not so illustrated, is preferably provided with ball bearings to accurately center the same and minimize friction.

The magnet frame may, of course, be of any preferred construction and secured to any suitable support. As shown, it is provided with bolts 10 and 11 for securing the same to suitable supports 12 and 13. Also, the bracket 8 carrying the roller 9 may be provided with various forms of adjustment. For example, it may be mounted to slide upon pins 14 and 15 projecting from the magnet frame 1 and connected to a screw adjusting shaft 16 threaded through the magnet frame.

If it be desired to work the roll or other body on a convex surface the magnets may be employed to press a suitable device against said roll or other body or mechanical means may be employed, if preferred.

What I claim as new and desire to secure by Letters Patent is:

1. The method of curving the surface of a yielding body consisting in bowing the body to produce a surface curvature negative of that desired and then grinding or otherwise working such curved surface along a straight line.

2. The method of longitudinally curving the surface of a cylindrical body consisting in bowing such body and then revolving the same about its distorted axis and simultaneously grinding or otherwise working the surface thereof along a line parallel with its true axis.

3. In combination, a work support, and means acting upon the work confined in said support to bodily distort the same between certain points to effect a surface curvature thereof.

4. In combination, means including two spaced parts for rotatably supporting a body to be worked, and means to effect axial distortion of such body between such points and to hold such body for rotation about its distorted axis.

5. In combination, a work support having parts to hold the work at spaced points, electromagnetic means acting upon the work between said spaced points to bodily distort the same upon a curved line and mechanical means limiting the distortion of the work to a predetermined degree.

6. In combination, means including spaced members for revolubly supporting a body to be worked, and electromagnetic means acting upon said body intermediate of such points to axially bow the same and to hold said body for rotation about its distorted axis.

7. In combination, means for revolubly supporting a body to be worked, an abutment intermediate of the points of support of said body and electromagnetic means to attract said body against said abutment for axial distortion of the former.

8. In combination, means for revolubly supporting a body to be worked, an abutment intermediate of the points of support of said body and electromagnetic means to attract said body against said abutment for axial distortion of the former, said abutment being adjustable to vary the degree of distortion effected by said electromagnetic means.

In witness whereof I have hereunto subscribed my name in the presence of two witnesses.

CLARK T. HENDERSON.

Witnesses:
TEKLA BART,
L. A. WATSON.