(No Model.)

C. A. NIGHMAN.

ROLLING MILL.

No. 384,063. Patented June 5, 1888.

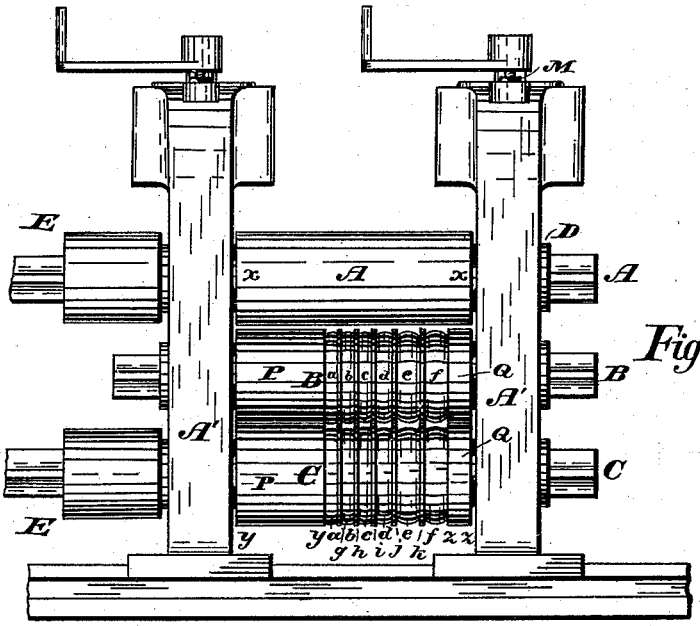

Fig. 1.

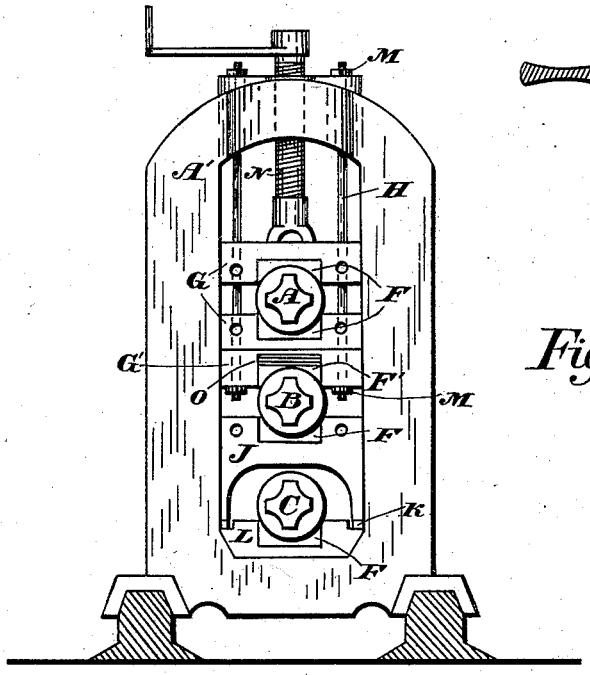

Fig. 3.

Fig. 2.

WITNESSES:

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CHARLES A. NIGHMAN, OF CANTON, OHIO.

ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 384,063, dated June 5, 1888.

Application filed April 4, 1888. Serial No. 269,535. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. NIGHMAN, a citizen of the United States, and a resident of Canton, county of Stark, State of Ohio, have invented a new and useful Improvement in Rolling-Mills, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to improvements in rolls for rolling-mills, and more particularly to improvements in rolls for rolling bars of iron or steel for wagon springs and tire.

With these ends in view my invention consists of the hereinafter-described rolls and combinations, as set forth in the claims.

Figure 1 is a front elevation of a train of three-high finishing-rolls, illustrating my invention. Fig. 2 is an end elevation of same, showing the housing-frame and journal-boxes; Fig. 3, a view in cross-section of spring-bar.

The object of this invention is to provide rolls for finishing light bars accurately of special form and greater length than have been produced heretofore.

Rolls A B C represent the rolls of a three-high finishing-train embodying my invention.

Roll A is of the usual form of plain rolls, having end journals, D, and coupling portion E. The journals D are supported in journal-boxes F F′, the said journal-boxes resting in yokes G. The yokes G and G′ are supported on rods H. The pillow-block J rests on levers K, by which it may be adjusted vertically. Pillow-block L rests upon the bottom of the yoke. The vertical adjustment is secured by the threaded nut M on the ends of the rods H, and the upper yoke, G, by the gage-screws N. A space between the journal-box F′ and the yoke G′ is provided, in which liners may be placed to regulate the space between the rolls B and C.

The rollers A, B, and C are made of suitable metal, and are placed in the housing A′ in vertical order. Roller A has a plain smooth surface and of equal diameter throughout its length from shoulders X to X. Rolls B and C are of substantially the same form, each having plain end portions, P and Q, of equal diameter from Y to Y and from Z to Z.

The rolls B and C are provided with corresponding grooves, *a b c d e f*, having convex bottoms, substantially as shown, and intervening rings or ribs *g h i j k*, having vertical sides, as shown. The plain portion P is used for reducing the bars to a given size, and the end portion to form a vertical side to the groove *f* and a support for the end of the roll, the portion Q of the roll B resting on a corresponding portion on the rollers C. Between the journal-box F′ and yoke G′ there is provided a space for liners O, by which the space between the rollers B and C may be regulated, or divided as between the rollers B and C. The space between rollers A and B may be regulated by the gage-screws N.

The train of rollers hereinbefore described is what is known as "finishing-rolls," the billet having been broken down and reduced to a size approximating the size of the finished bars by rollers otherwise provided. When a bar so reduced reaches the finishing-train hereinbefore described, it is passed through between A and B on the plain portion of the roll B and between the shoulders Y and Y, and back (without reversing) between the rollers B C in one of the grooves *a b c d e f*, which reduces the bar not only to size, but to desired form—that is, a bar for wagon or other springs having its two sides concave, so as to reduce the thickness of the longitudinal center of the bar two or three gages, (more or less, as may be preferred.) The object of thus forming the bars is to insure a full edge on the bar, so that when the spring-leaves are laid one upon another the outer edges will touch each other, thus forming a close fit or joint throughout the length of the spring-bar, as shown in cross-section. (See Fig. 3.) By passing through the convex grooves hereinbefore described the stock is removed from the center to the edges, thus securing a full and finished edge to the bar.

The advantage of a three-high train of rolls having the plain portions P and convex grooves consists, first, in the fact that a bar of an even gage may be made throughout its entire length, as there is no loss of time required to reverse the bar; as the bar is constantly cooling as it passes through the rolls, the last end out will as a matter of course be colder and harder, and for that reason larger. Now, to equalize this, in the backward pass the larger and colder end of the bar first enters between the rolls B C in the convex grooves,

by which it is brought to size and form. The other end, being smaller, by reason of its having passed between the rolls A and B at a higher temperature, will also be reduced to size, thus producing a bar of even width and gage throughout the entire length.

Not only is a better result achieved by the hereinbefore-described rolls than by those heretofore used, but the output of the mill greatly increased and the initial cost reduced, in this that the operation is almost continuous, there being no loss of time to "reverse" or run the bar back over the top roll idle, as is the case with a reverse or two-roll mill, and also in the further fact that the train can be operated by a less number of men than required by the ordinary "reverse mill," and a bar of seventy-four feet rolled instead of thirty-six feet, as with a two-roll mill.

If preferred, the bars for wagon-tire may be first passed between the rolls B and C on the plain portions P, and back between the rolls A and B, making a bar concave on one side and flat on the other with heavy edges throughout its length.

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

1. A three-high train of rolls placed in vertical order in suitable housing, consisting, essentially, of an upper roll, as A, of plain surface and even diameter throughout its length, between journals, and a middle roll, as B, and a bottom roll, as C, having corresponding plain surfaces, as P and Q, and corresponding convex-bottomed grooves, as *a* and *f*, forming double concave grooves between the rolls B C, and a groove between the rollers A and B flat on one side and concave on the other, substantially as described, and for the purpose set forth.

2. In combination with housing A′, the plain driven roll A, supported in journal-boxes F, suspended in yokes G, supported on rods H, a free middle roller, B, resting in journal-boxes F and F′, pillow-block J, a driven bottom roller, C, journal-box F, pillow-block L, and means for adjusting and securing the rolls in adjustment, substantially as described, and for the purpose set forth.

In testimony whereof I have hereunto set my hand this 27th day of March, A. D. 1888.

CHARLES A. NIGHMAN.

Witnesses:
W. K. MILLER,
CHAS. R. MILLER.