(No Model.) 3 Sheets—Sheet 1.

G. LEHBERGER.

WIRE ROD MILL.

No. 486,382. Patented Nov. 15, 1892.

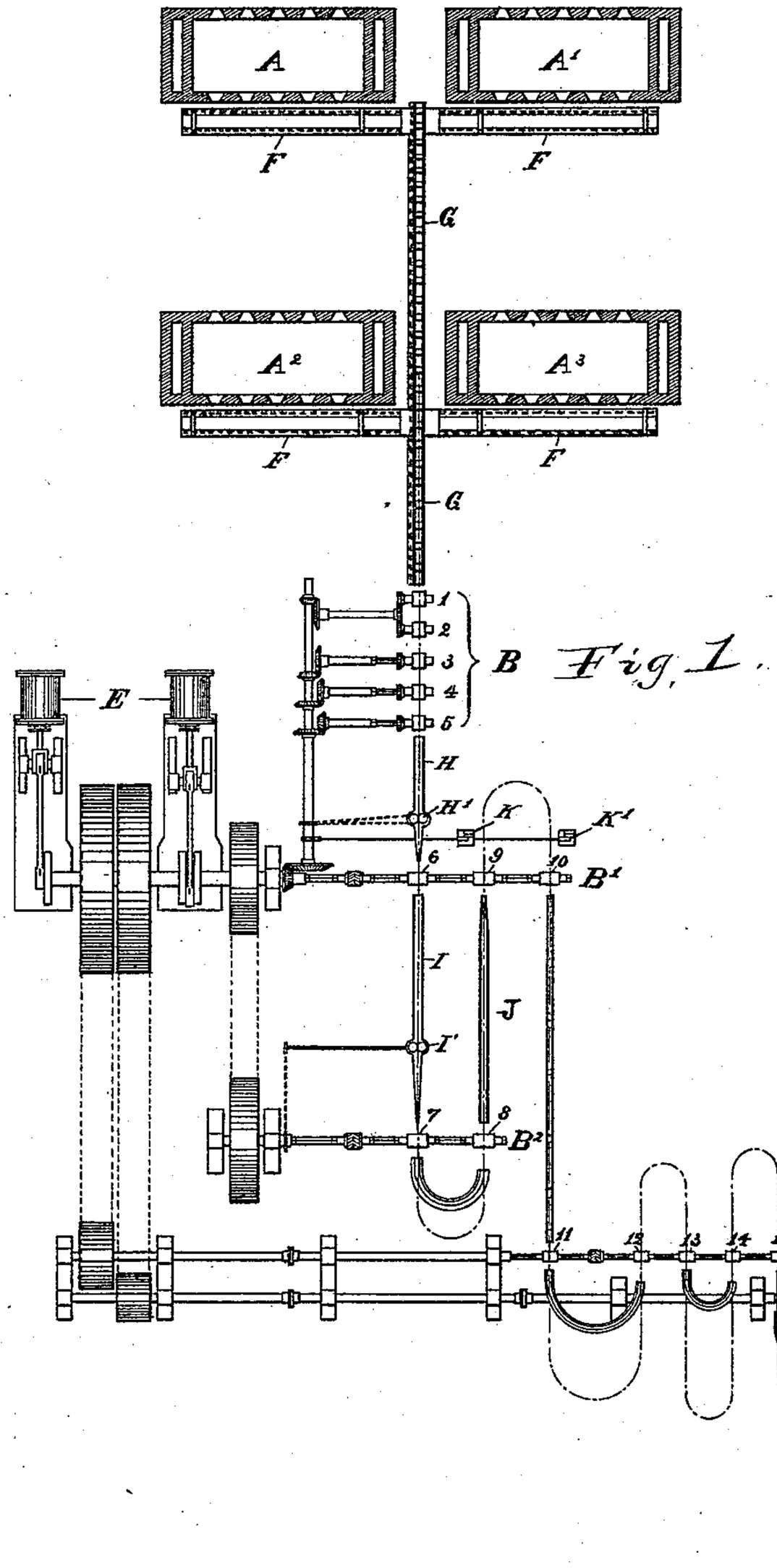

Fig. 1.

WITNESSES.

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(No Model.) 3 Sheets—Sheet 2.

G. LEHBERGER.

WIRE ROD MILL.

No. 486,382. Patented Nov. 15, 1892.

Fig. 1.

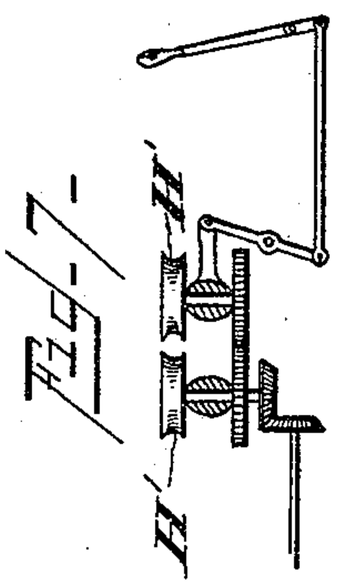
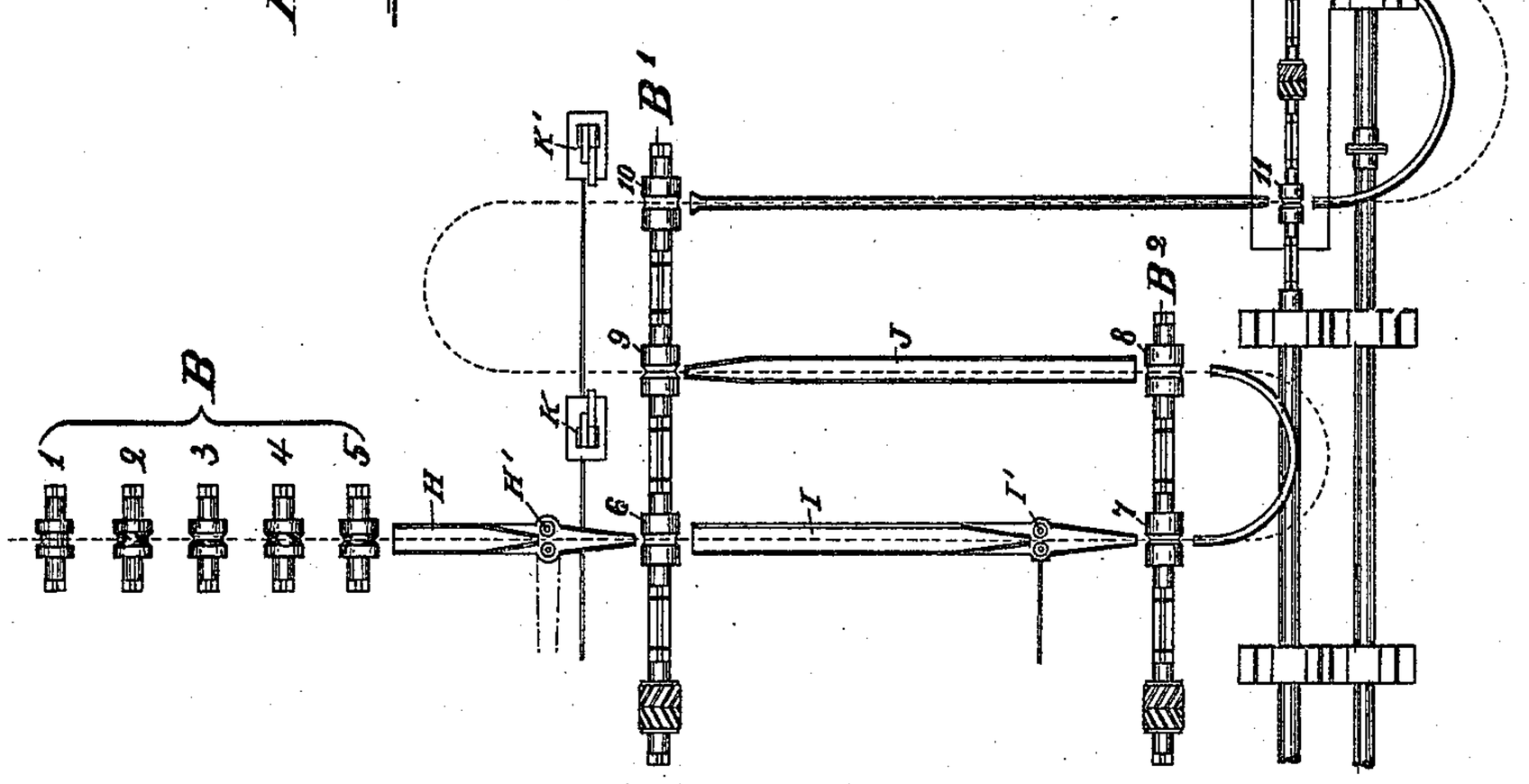


Fig. 2.



WITNESSES.

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3 Sheets—Sheet 3.

G. LEHBERGER.

WIRE ROD MILL.

No. 486,382. Patented Nov. 15, 1892.

Fig. 3.

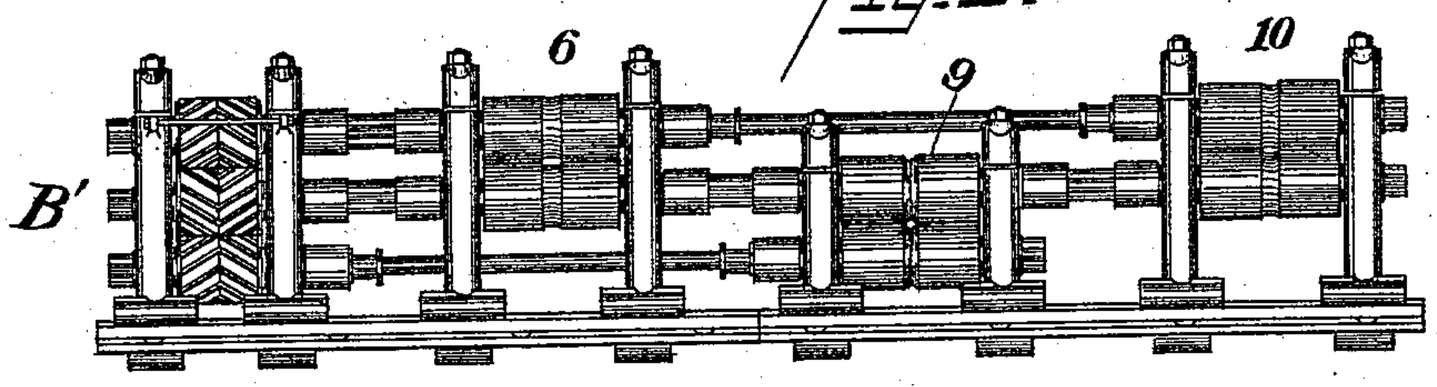


Fig. 4.

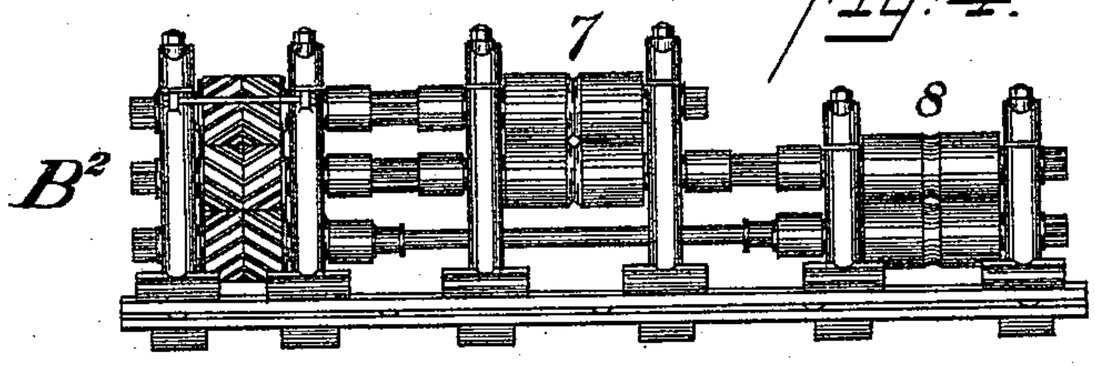


Fig. 5.

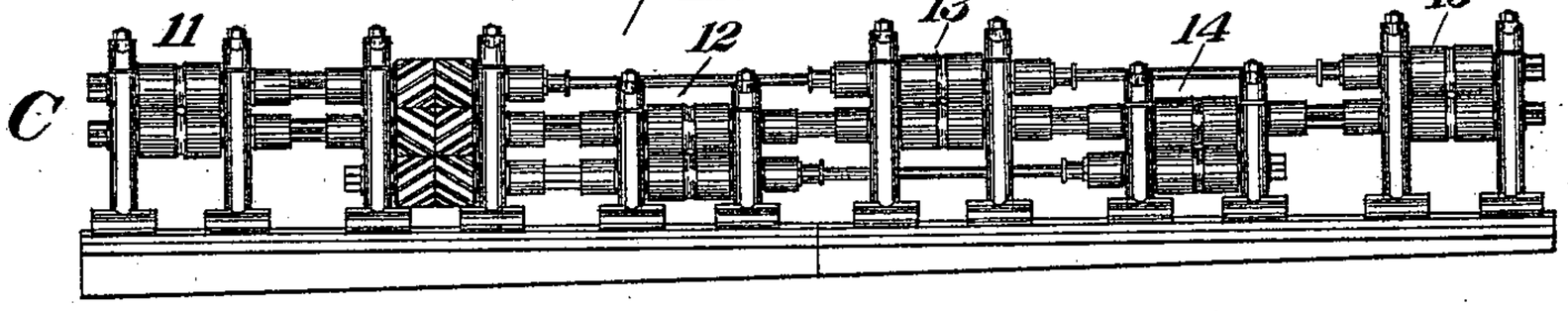
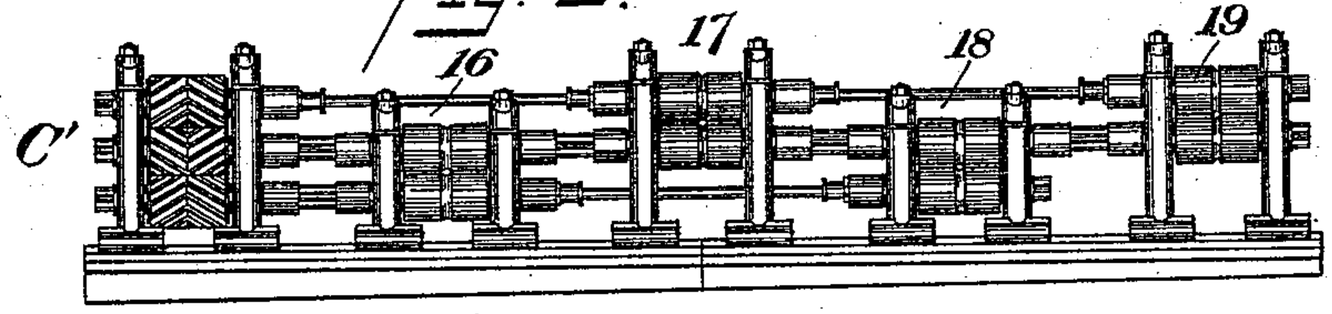


Fig. 6.



WITNESSES.

H. B. Corwin

H. M. Corwin

INVENTOR.

George Lehberger

by W. Bakewell & Sons

ATTORNEYS.

UNITED STATES PATENT OFFICE.

GEORGE LEHBERGER, OF JOHNSTOWN, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO FRED. W. STAMMLER, OF SAME PLACE.

WIRE-ROD MILL.

SPECIFICATION forming part of Letters Patent No. 486,382, dated November 15, 1892.

Application filed March 16, 1892. Serial No. 425,150. (No model.)

To all whom it may concern:

Be it known that I, GEORGE LEHBERGER, of Johnstown, in the county of Cambria and State of Pennsylvania, have invented a new and useful Improvement in Wire-Rod Mills, 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—

Figure 1 represents a plan view of my improved rod-mill. Fig. 2 is a plan view of a portion of the same on a larger scale. Figs. 3 to 6, inclusive, are front elevations of the various sections of the mill, and Fig. 7 is a detail view of the feed-rolls employed in the guide-troughs.

My invention relates to that class of rolling-mill plants wherein billets are reduced to rods; and it consists in a peculiar construction of the roughing-train, whereby all manual labor in introducing the bars into the various passes is dispensed with, as well as in the construction and arrangement of the parts, as hereinafter more fully described, and set forth in the claims.

In the drawings, in which like symbols of reference indicate like parts, A, A′, A^2, and A^3 indicate furnaces for heating the billets before rolling. At one side of each furnace is located a conveyer F, by which the billet, which is placed crosswise thereon, is carried to the main conveyer G, which is located at right angles to the conveyers F and carries the billets to the roughing-train. The conveyers F may be simply in the form of inclined guides or endless chains leading to an incline, which guides the billets to the main conveyer, or in any other form desired. The conveyer G also may consist of an endless chain or feed-rollers, it being of sufficient length to carry the billets from any of the furnaces.

The first section B of the roughing-train consists of five sets of two-high rolls 1, 2, 3, 4, and 5, placed in line ahead of each other. Of these sets the first set 1 acts merely as feed-rollers to carry the billet to the second set, these two sets being rotated at substantially the same speed from a side shaft by means of the bevel-gear and pinions shown, an intermeshing pinion serving to rotate the second roll of each set. Suitable troughs are employed between each set of rolls to guide the bar to the proper pass of the succeeding set, and each set is driven at a higher speed than that of the preceding to make up for the elongation of the bar. To effect this result the succeeding bevel-wheels upon the side shaft grow larger and those upon the roll-shafts correspondingly smaller. The second section B′ consists of three sets of three-high rolls 6, 9, and 10, all driven directly by the engine E, as shown. Between the section B and the first pass of the section B′ is located the guide-trough H, which is of greater length than the bar as it emerges from the first section and contains positively actuated feed-rollers H′, driven by a chain connected to the side shaft or other suitable means. These rollers H′ are so arranged that they may be thrown out of gear, so as to stop the bar in the trough when desired, one roller being reciprocated by the lever, as shown in Fig. 7, to engage or release the bar.

A third section B^2 of the roughing-train consists of two sets of two-high rolls 7 and 8, driven by a three-high set of pinions, as shown in Fig. 4, and between the first passes of the sections B′ and B^2 is a guide-trough I, of greater length than the bar as it emerges from the rolls 6, and having guide-rollers I′, similar to the rollers H′, before mentioned. A guide J connects the set of rolls 8, comprising the second pass of section B^2 and the set 9 of section B′, this trough being shorter than the bar as it emerges from the set of rolls 8, and a curved guide or repeater guides the bar from the upper pass-rolls 7 to the lower pass of rolls 8, these rolls feeding it to the rolls 9. On one side of the rolls 9 and 10 are located shears K and K′, at which the crop ends of the bars are sheared off, the bar then being introduced into the rolls 10 by the shearman. One or more troughs, depending on the number of passes of rolls B′, guide the bars to the first section C of the finishing-train, and as the distance between the trains B′ and C is shorter than the length of the bar no feeding-rollers are required. The two sections of the finishing-train are driven by belting at different speeds, and as the size of the rolls increase the circumferential speed is correspondingly increased. The section C has five sets and the section C′ four sets of rolls, as

shown, the rod being guided from one pass to the next by repeaters on one side and on the other side by catchers and feeders, as ordinarily. From the finishing-train the rods pass to and are reeled upon the reels D.

The operation is as follows: The billets being heated in the furnaces are removed therefrom and then placed upon the conveyers F, whereby they are automatically carried to the roughing-rolls. Passing through the first section B the bars are received in the trough H and fed forward by the rollers H′ to the first pass of the second section B′ of the roughing-train, thence through feed-rollers I′ to the first pass of section B^2, and thence returns to the second pass of B′. After passing therethrough the ends of the bar are sheared off, if necessary, and inserted in the set 10 of section B′, passing thence to the finishing-train and the reels. The shearman can watch the entire system of rolls, and if any accident should occur to the finishing-rolls he can throw the rollers H′ or I′ out of gear and stop the bar in the trough H or I. If the bar gets cold while in these troughs it can be removed and taken back to the furnace for reheating. The speed of the rolls 9 must be greater than that of the rolls 8, since they receive the bar before it leaves the rolls 8, and hence this section B^2 of the roughing-rolls must be run at a slower rate of speed than the section B′. This is possible, as the bar leaves the rolls 6 before it reaches the rolls 7, and this set B^2 may be termed the "reducing or relief train," as the speed is reduced and the train B′ relieved of a portion of its work, though it is necessarily a part of the train B′, since the bar emerging from the rolls 6 and passing through the train B^2 is then returned to the train B′ and directed through two sets of rolls therein.

The advantages of my invention are obvious. The work of the men at the roughing-rolls is done away with and the metal fed automatically throughout the entire system. The metal can be fed more quickly than in former mills, and hence more rods can be run through the mill than was formerly possible and the metal emerges much hotter at the finishing-rolls than formerly, thus preventing waste and imperfect rolling.

As my invention consists in the construction and arrangement of the roughing-train, the succeeding trains may be arranged in any suitable manner.

Many other changes may be made in the form and arrangement of the parts without departure from my invention.

What I claim is—

1. In a rod-mill, the combination of a preliminary roughing-train, a guide leading therefrom to the first pass of a second roughing-train, a guide leading from said first pass to the first pass of a third roughing-train, and a guide leading from another pass of the third train back to another pass of the second train, substantially as and for the purposes described.

2. In a rod-mill, the combination of a preliminary roughing-train, a guide having positively-actuated feed-rollers leading therefrom to the first pass of a second roughing-train, a guide leading from said first pass to the first pass of a third roughing-train, and a guide leading from another pass of the third train back to another pass of the second train, substantially as and for the purposes described.

3. In a rod-mill, the combination of a preliminary roughing-train, a guide leading therefrom to the first pass of a second roughing-train, a guide having positively-actuated feed-rollers leading from said first pass to the first pass of a third roughing-train, and a guide leading from another pass of the third train back to another pass of the second train, substantially as and for the purposes described.

4. In a rod-mill, the combination of a preliminary roughing-train, a guide leading therefrom to the first pass of a second roughing-train, a guide leading from said first pass to the first pass of a third roughing-train, a guide leading from another pass of the third train back to another pass of the second train, and shears located adjacent to the second train, substantially as and for the purposes described.

5. In a rod-mill, the combination of a preliminary roughing-train, a guide leading therefrom to the first pass of a second roughing-train, a guide leading from said first pass to the first pass of a third roughing-train arranged to run at a slower speed than the second train, and a guide leading from another pass of the third train back to the second train, substantially as and for the purposes described.

6. In a wire-rod mill, the combination of a continuous roughing-train, a second open train provided with three sets of rolls and having its first pass in line with the last pass of the first train, a third train provided with two sets of rolls and having its first pass in line with the first pass of the second train, feed-rollers between the passes above recited, and a guide leading from the second pass of the third train to the second pass of the second train, substantially as and for the purposes described.

7. In a wire-rod mill, the combination, with a roughing-train, of feed-rollers arranged to transfer the metal therefrom to a train arranged to rotate at a slower speed and a guide leading from the reducing-train back to the roughing-train, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 25th day of February, A. D. 1892.

GEORGE LEHBERGER.

Witnesses:
DAVID S. MCCANN,
H. M. CORWIN.