

(No Model.)

F. H. DANIELS
ROD ROLLING MILL.

No. 419,422.

Patented Jan. 14, 1890.

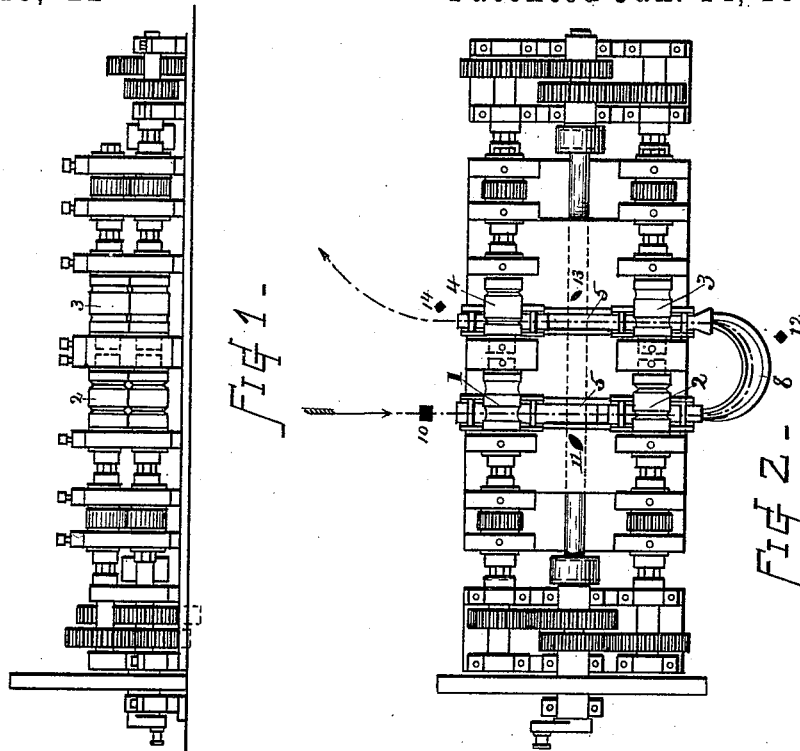
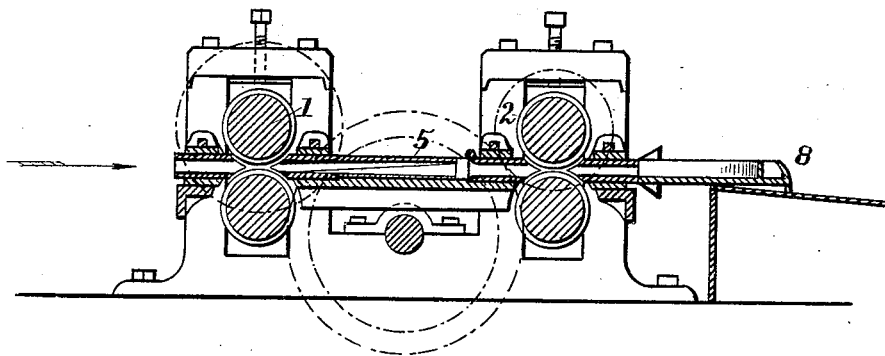


Fig 3.



WITNESSES.

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ROD-ROLLING MILL.

SPECIFICATION forming part of Letters Patent No. 419,422, dated January 14, 1890.

Application filed May 24, 1889. Serial No. 311,962. (No model.)

To all whom it may concern:

Be it known that I, FRED H. DANIELS, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Rolling-Mills, of which the following, together with the accompanying drawings, is specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

The object of my present invention is to provide a rolling-mill that can be operated with greater economy and a higher degree of practical efficiency in the production of wire rods and to arrange the rolls and guides in such manner that the rods or rolled product can be automatically advanced through the mill at high speed and worked without liability of escaping or creating waste.

To this end my invention consists in the features of improvement hereinafter described and claimed.

In the drawings, Figure 1 is a front elevation, Fig. 2 is a plan view, and Fig. 3 is a transverse section, of so much of a rolling-mill as will illustrate the nature of my invention.

In the present drawings I have shown a mill embracing only four pairs of rolls; but it will be understood that any desired number of pairs of rolls may be employed, arranged in the order specified, as may be necessary for giving the required amount of reduction to the rod.

In accordance with my present invention, the pairs of rolls are arranged in two rows for backward and forward feeding of the rod, or in sets of two pairs of rolls in each set, one pair in front of another, the first pair of rolls in the order of action on the metal being fitted to impart an oval cross-section and the second pair a square cross-section, and so on alternately throughout the series. By "oval" I mean all cross-sections which are long one way and short the other, and by "square" I mean all cross-sections whose length and width are substantially the same.

In the drawings, 1 and 3 denote the pairs of rolls that impart the oval cross-sections to the bar or rod, and 2 and 4 the pairs of rolls that impart the square section. From the

rolls 1 the bar passes straight to the rolls 2; likewise from the rolls 3 to the rolls 4. Between the pairs of rolls that are directly in line I arrange straight guides 5, which are suitably formed for twisting the oval cross-section ninety degrees, (except when the second pair of rolls is disposed with vertical axes, as may in some cases be done,) so that it will enter the succeeding rolls at right angles to the cross-section as delivered from the rolls that give the oval. From the rolls 2 to the rolls 3, (and from the rolls 4 to succeeding pairs when used,) I arrange a semicircular guide 8, having an outer rim that directs the end of the square-sectioned rod around the curve and returns it into the entering guide of the oval pass-rolls. Thus the ovals are fed directly forward and twisted, while the squares are fed in the semicircular return guides or repeaters.

By arranging the rolls in sets of two pairs each for double action and making the ovals in the first pair of rolls in each set and the squares in the second pair of the sets the semicircular or repeater guides are required to carry only the square-sectioned rods, which can be automatically returned and entered more surely than ovals can be entered into the bite of the rolls, while the oval sections are conducted direct or in a substantially-straight line by the guides 5 as they pass the shorter distance from the first to the second pair of rolls, which they meet with the vigor of a straight thrust. Consequently there is less liability of the rolls failing to "bite on" than there would be under other conditions; hence the automatic efficiency of the mechanism is greatly enhanced and a more perfect action and higher rate of speed are attainable by this improvement.

The form of the rod-section at various stages of its reduction is indicated on Fig. 2 at corresponding positions in the mill, as at 10, 11, 12, 13, and 14.

The construction of the journal-bearings, housings, connecting-gearing, and operating-shafting for supporting and rotating the several pairs of rolls at proper speeds is disposed as herein illustrated, with the rolls arranged in two rows, end to end, adjacent to each other, and so that the passes are all in the same plane parallel with the axes, the driv-

ing-gearing being located beyond the rolls at the right and left. If a greater number of pairs of rolls are employed, then the two lines of rolls and gearing would be extended in the same order by adding alternately housings for gears and housings for rolls, (or vice versa,) and additional repeaters or semicircular guides similar to that shown at 8 for returning the end of the rod or bar for passage through said additional pairs of rolls.

It will be understood that I do not herein claim the feature of placing pairs of rolls in two lines for duplex action (*i. e.*, the passing of the product through two pairs at each entry back and forth,) as I have in my previous Letters Patent, No. 387,495, claimed a rolling-mill embracing such feature.

What I claim as my invention, to be herein secured by Letters Patent, is—

1. A rolling-mill for the purpose specified, having its pairs of rolls arranged with their passes all in the same horizontal plane and disposed for operating in duplex order the alternate pairs of rolls grooved for forming oval cross-sections and square cross-sections, respectively, and provided with guides that conduct the oval bar or rod in a straight line from the oval-grooved rolls to the square-grooved rolls and with horizontal semicircular repeater-guides having an open top and a

flange that conduct the square bar or rod from the square-grooved rolls to the oval-grooved rolls, substantially as set forth.

2. In a rolling-mill for the purpose specified, a series of pairs of rolls arranged in sets of two pairs, the first pair in each set having grooves that form the bar or rod to an oval cross-section and the second pair in each set having grooves that form a square cross-section, the different sets of rolls being all disposed with their passes in a common plane parallel with their axes, in combination with a twisting guide that conducts the oval rod in a substantially-straight line from the first to the second pair of rolls, and a semicircular open-topped repeater-guide in the plane of the roll-passes, having an upwardly-projecting flange that conducts the square rod from said second pair of rolls around the return-curve and directs it into the first pair of rolls of the next succeeding set, and means, substantially as described, for imparting rotative motion to the rolls, as set forth.

Witness my hand this 20th day of May, A. D. 1889.

FRED H. DANIELS.

Witnesses:

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