2 Sheets—Sheet 1

J. H SWETT.

Mill for Rolling Metal.

No. 200,582. Patented Feb. 19, 1878.

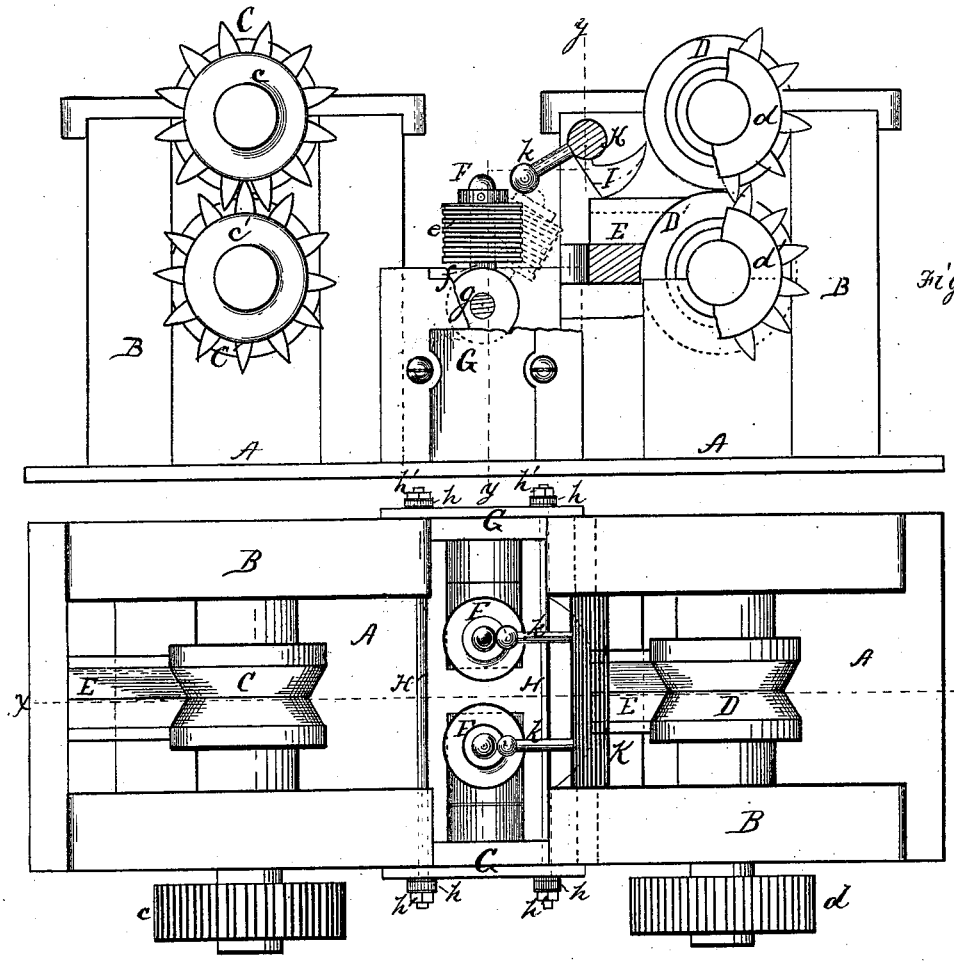

Fig. 1.

Fig. 2.

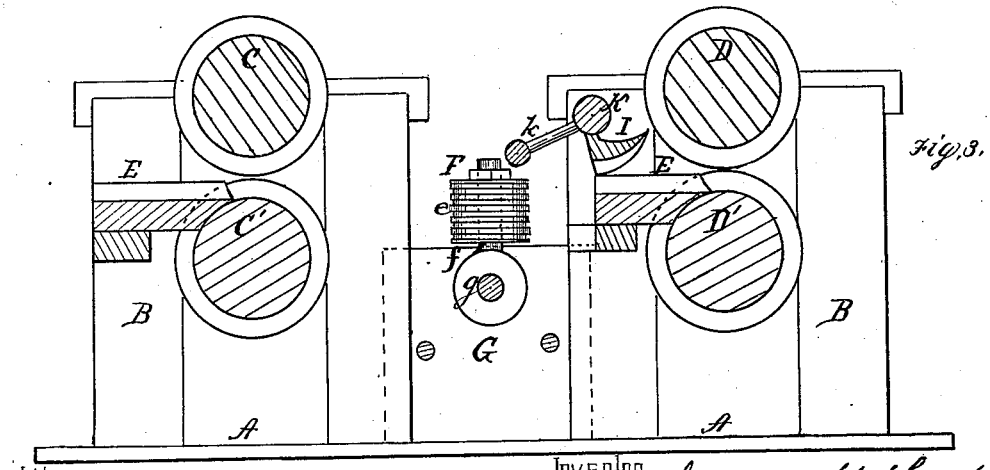

Fig. 3.

Witnesses.
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2 Sheets—Sheet 2.

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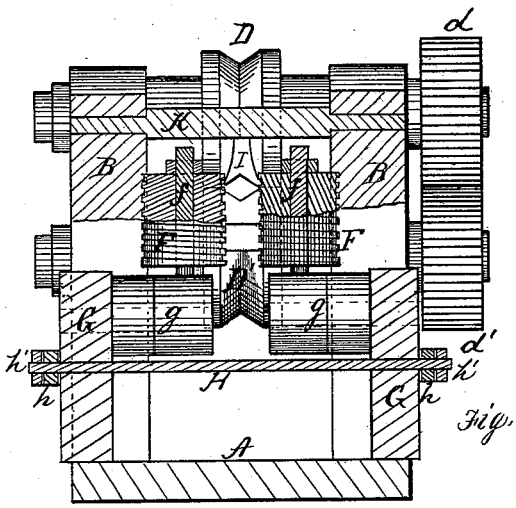

Fig. 4.

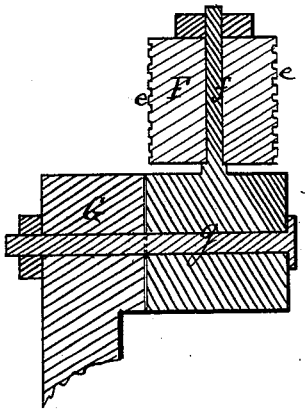

Fig. 5.

Witnesses.
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UNITED STATES PATENT OFFICE.

JAMES H. SWETT, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN MILLS FOR ROLLING METAL.

Specification forming part of Letters Patent No. **200,582**, dated February 19, 1878; application filed September 3, 1877.

To all whom it may concern:

Be it known that I, JAMES H. SWETT, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Mills for Rolling Metal; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is an elevation, partly in section, of a machine embodying my invention. Fig. 2 is a plan view; Fig. 3, longitudinal vertical section on the line *x x*, Fig. 2. Fig. 4 is a transverse section on the line *y y*, Fig. 1; and Fig. 5 is a detached view of the threaded guide-rolls.

Like letters refer to like parts wherever they occur.

My invention relates to the construction and operation of mills for breaking down and rolling rods, &c.; and consists, first, in combining, with the work-rolls, guide-rolls constructed and adapted to turn, cant, or twist the bar as it passes from one pair to another pair of work-rolls of a series; and, secondly, in combining a swinging guide with the work and guide rolls to insure the proper entrance of the metal between the guide-rolls; and, finally, in details of construction hereinafter specified, whereby the best results are obtained.

In breaking down metal for rolling rods, bars, wire, &c., the metal, either oval, square, or diamond shape in cross-section, is passed through a series of reducing-rolls, being turned at each pass so as to bring that portion of the bar which was previously at the edge of the groove into the bottom of the groove in the succeeding pass, thereby drawing the metal uniformly, and working out any fin formed by the spread of the metal between the rolls.

The method commonly adopted is to turn the metal by hand between each pass; but this involves much labor and expense, to overcome which various devices have been tried—as, for instance, the arrangement of the rolls alternately in vertical and horizontal pairs, the interposition of twisted channels or guide-boxes between the rolls, and, where tongued and grooved rolls have been employed, the reversing of the position of the tongues and grooves in the alternate pairs of rolls, together with the interposition of guides.

For various reasons well known to the practical metal worker and manufacturer, all the above devices have proved more or less ineffectual, and the old method is practiced in preference to the continuous method, which reduces the number of hands employed.

The object of my invention is to supply devices for and render practicable the continuous rolling of rods, wire, and like articles.

I will now proceed to describe my invention, so that others skilled in the art to which it appertains may apply the same.

A indicates a bed, upon which are erected suitable housings B B, corresponding in number to the number of pairs of rolls to be employed. C C′, D D′, &c., represent rolls properly journaled in the housings B, provided with housing-screws, each pair geared, as at *c c′ d d′*, to run together, and driven through or by means of well-known gearing, so that each succeeding pair of rolls shall move sufficiently faster than the preceding pair to accommodate the increased length of the metal due to the drawing of the same, the grooves in said rolls being reduced in size according to the amount the metal is to be reduced at each pass, all of which is within the knowledge of the skilled mechanic, and can be varied at pleasure, according to the work to be performed by the rolls. Supported by the housings are short guide boxes or troughs E, which receive the metal from the rolls and guide it to the mechanism now to be described.

In order to turn or twist the rod or bar one-quarter, or through such space as is required to feed it properly to the succeeding pair of rolls, I interpose one or more pairs of guide and turning rolls, F, between each pair of rolls C C′, D D′, &c.

The rolls F are preferably threaded upon their circumference, as indicated at *c*, the pitch of the thread being adapted to the degree of rotation to be given to the metal; and, in order to increase or decrease the rotation of the bar at pleasure, the rolls are mounted upon shafts *f*, pivoted in or on suitable frames G, by means of oscillating shafts *g*, or in any other manner adapted to produce the result pointed out herein. To admit of the proper

introduction of the leading end of the rod or bar between the guide-rolls after it has left the reducing or work rolls, the guide-rolls should be provided with relief or spring mechanism, which I usually construct as follows: The frames G for the guide-rolls are loosely arranged between the housings B B, are provided with shoulders which bear on the outer sides thereof, and are connected by transverse binding-rods H H, upon which are springs *h h*, preferably of rubber, that permit the frames and rolls to yield or separate slightly for the purpose specified. The amount of relief or spring permitted to the rolls can be controlled by the nuts *h' h'* of rods H H.

Owing to the pivoting of the roll-shafts *f*, whereby the feed-rolls may be canted more or less at will, the threading of the rolls may be dispensed with, plain rolls being employed and canted to obtain the same effect in a certain degree, though not in so efficient and reliable a manner.

I represents a swinging guide or stripper, usually cam-shaped, or similar to the segment of a circle secured to a shaft, K, pivoted in or journaled on the housings, said shaft being provided with counterpoises *k k*, which hold stripper I up to the roll. Each pair of rolls of the series are, or may be, provided with such a guide and stripper, as well as with guide-rolls, and, should the leading end of the metal being drawn split in the pass, the guide I will strip it from the roll, compress it, and cause it to enter properly between the guide-rolls F. Owing to the pivoting of the guide, it is free to swing past the center, and can turn up and back out of the way in case the metal buckles in the rolls.

The operation of my devices is as follows: The metal to be rolled, having been properly heated, is introduced between the first pair of rolls D D', and reduced somewhat by the first pass. Should the leading end split or show a tendency to follow the upper roll, it is arrested, stripped from the roll, and guided into the guide-rolls by the swinging guide and stripper I. The inclines of the guide-rolls seize the metal as it escapes from the work-rolls, and twist it or cant one side up and the other side down, until the portions which were at the edges of the grooves in the preceding pass enter and lie within the grooves of the succeeding pair of rolls. If, in working the guide-rolls, it is found the pitch of the thread or cant of the rolls (if plain rolls are employed) is not sufficient to give the requisite amount of twist or turn to the rod, the rolls may be still further canted until the desired result is obtained.

The advantages of my invention are its simplicity, effectiveness, and durability.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In combination with one or more pairs of work-rolls, a pair of guide-rolls having adjustably-pivoted bearings or shafts, substantially as and for the purpose specified.

2. In combination with one or more pairs of work-rolls, the adjustably-pivoted guide-rolls having relief bearing, substantially as and for the purpose specified.

3. In combination with one or more pairs of work-rolls, a pair of guide-rolls having threaded peripheries, substantially as and for the purpose specified.

4. In combination with the work and guide rolls, a swinging guide and stripper, substantially as and for the purpose specified.

5. In a metal-working machine, the swinging counterpoised cam-shaped guide and stripper, substantially as and for the purpose specified.

In testimony whereof I, the said JAMES H. SWETT, have hereunto set my hand.

JAMES H. SWETT.

Witnesses:
F. W. RITTER, Jr.,
JAMES I. KAY.