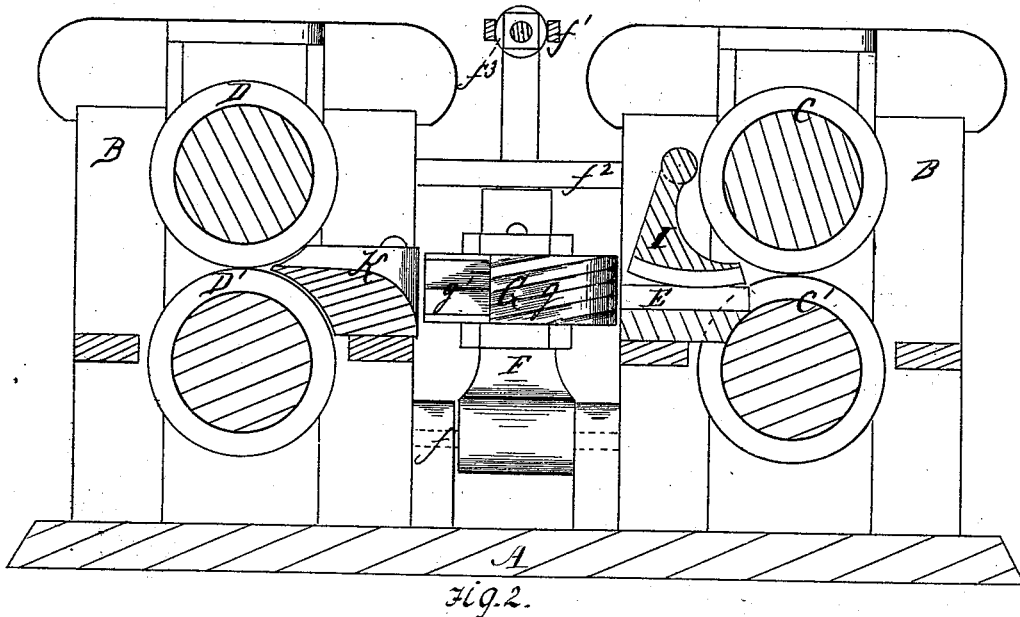
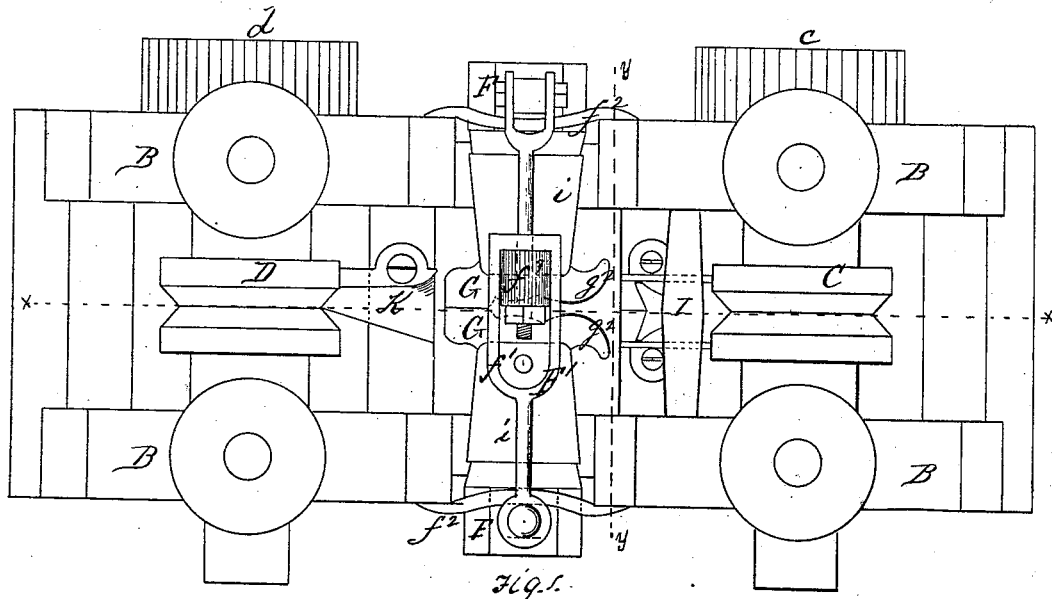


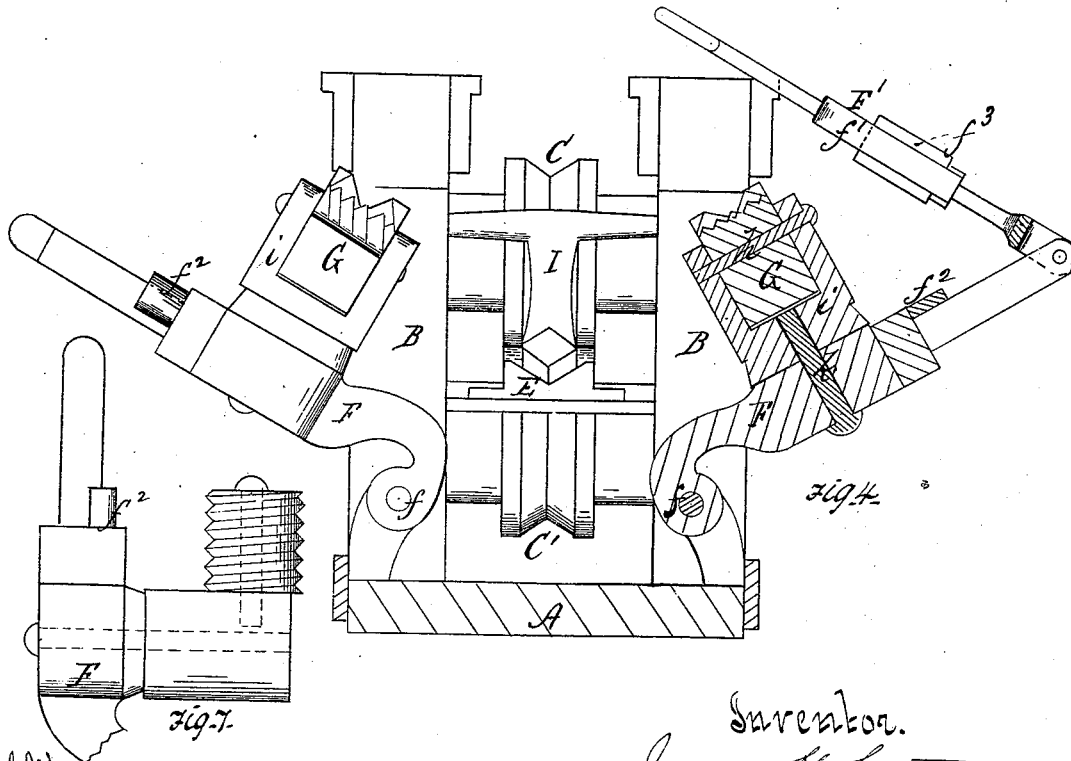
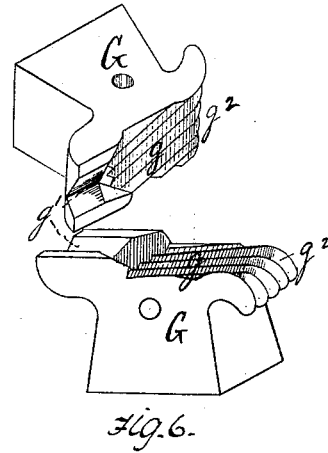
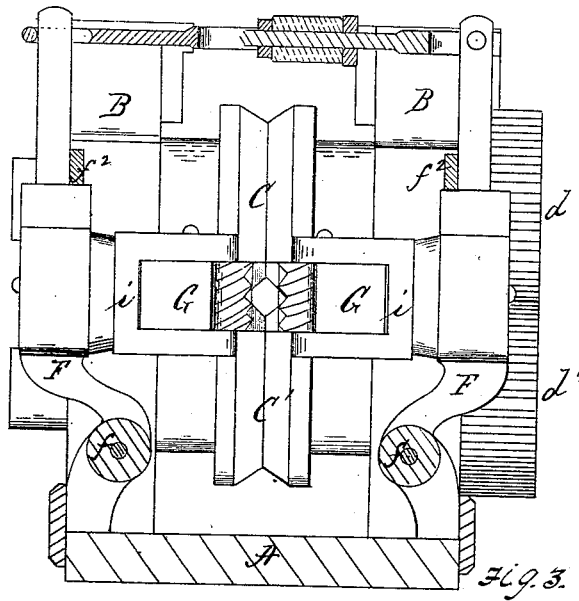
J. H. SWETT.
Mill for Rolling Metal.
No. 217,653. Patented July 15, 1879.



Witnesses
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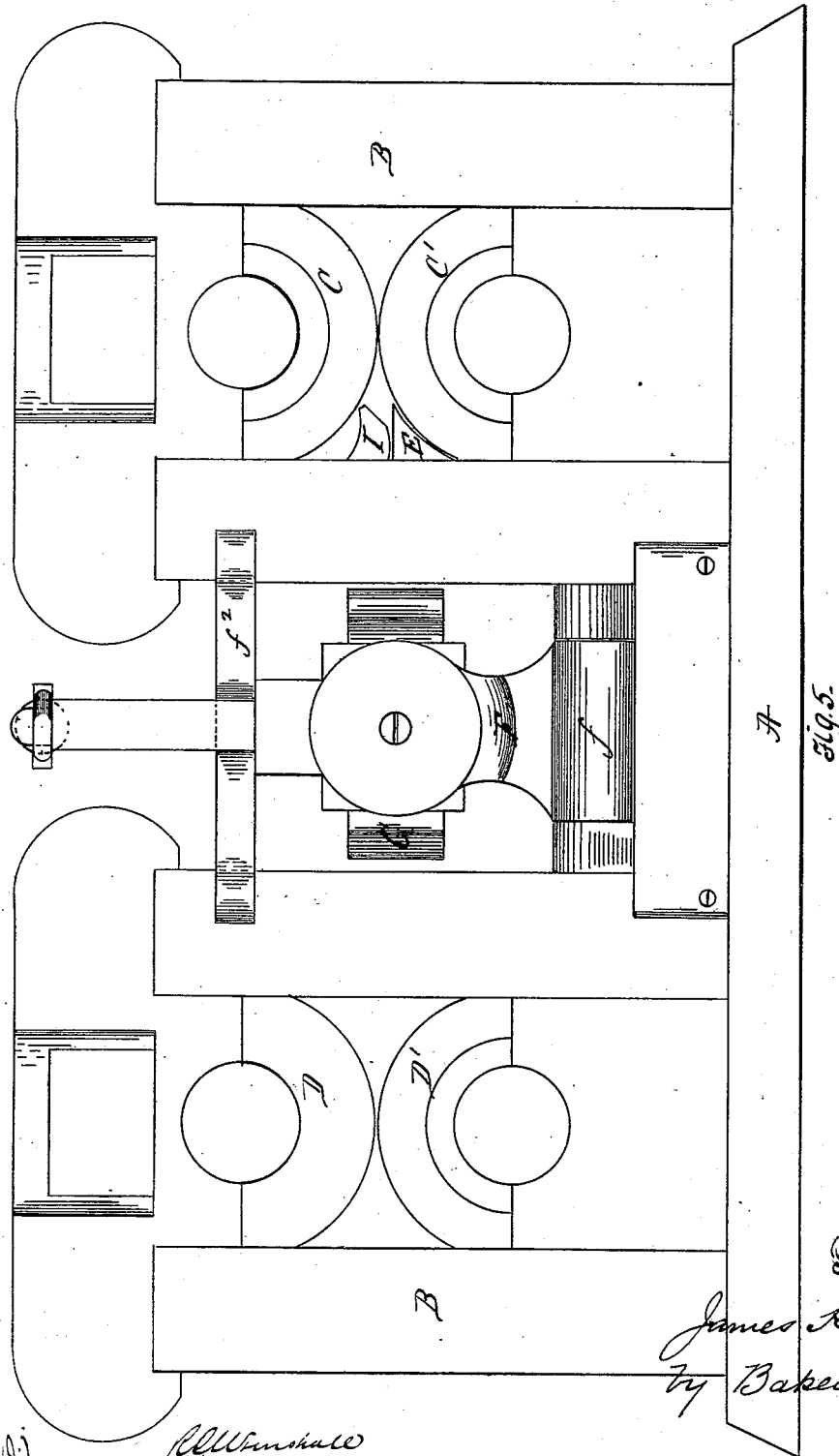
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UNITED STATES PATENT OFFICE.

JAMES H. SWETT, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN MILLS FOR ROLLING METAL.

Specification forming part of Letters Patent No. 217,653, dated July 15, 1879; application filed April 5, 1879.

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 drawings, forming part of this specification, in which—

Figure 1 is a top view of devices embodying my invention. Fig. 2 is a longitudinal vertical section on the line *x x*, Fig. 1. Fig. 3 is a transverse vertical section on the line *y y*, Fig. 1. Fig. 4 is a similar section, showing the swinging or hinged housing or frame thrown apart. Fig. 5 is a side elevation of the mill. Figs. 6 and 7 are detail views of two forms of guides.

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 pivoting or hinging the guide housings or frames so that the same may be thrown apart to relieve the mill and remove any rod or like article which may buckle in the guides; second, in forming the guides with diagonal and longitudinal grooves, the diagonal grooves of the opposite guides being reversely arranged so that the guides shall cant or turn the bar, rod, or like article during its passage between the same; and, finally, in details of construction herein-after more specifically pointed out.

In breaking down metal for rolling rods, bars, wire, &c., the metal is passed through a series of reducing-rolls, and is turned at each pass one-quarter rotation, more or less, to bring that portion of the bar which was near the edge of the groove in one pass at the bottom of the groove in the next pass, so that the metal will be drawn equally, and any fin formed by the spread of the metal between the rolls will be worked out.

Prior to the invention of guide rolls and boxes adapted to turn the bar between passes, the work was performed by hand, and was both laborious and expensive; and even after the bar-turning guides had been invented the labor continued in a great measure to be done

by hand, because the machinery was more or less imperfect and uncertain in its operation, and because the frequent buckling or twisting of the metal in the guides deranged the machinery and was a fruitful source of trouble and loss.

In a former patent granted to me the devices covered thereby—viz., relief and adjustable bearings for the guides, threaded guide-rolls, &c., (see Patent No. 200,582,)—in a great measure obviated the then existing difficulties, so that the operation of the machine was rendered more certain and accurate; but even with said perfected devices buckling of the metal in the guides will sometimes occur; and the main object of the present invention is to facilitate the removal of the metal from the guides when the buckling does occur, whether the guides employed are those described in my former Letters Patent or any other guides previously used. Another object is to obtain a construction which will guard against injury to the mill by buckling of the iron.

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 housings B B, corresponding in number to the number of rolls employed. C C' and D D', &c., represent rolls properly journaled in the housings B, provided with housing-screws (each pair of rolls 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 will according to the desire of the constructor and the work the rolls are to do. Supported by the housings are short guide boxes or troughs E, which receive the metal from the rolls and guide it to the mechanism for turning the bar, which mechanism is arranged between the rolls, and will now be described.

F F represent the frames or housings for

the guides which are located between the pairs of rolls. In order to permit of the ready separation of the guides, either to relieve the mill when buckling occurs, or to repair, replace, adjust, and change the guides, I pivot or hinge the frames *F* as at *f*; and to hold them together when in use I employ a link, *F'*, the vertical position of the housings *F* being insured by cross-bars or brace-arms *f*², which may be secured to the frames *F* and bear against the housings *B* of the work-roll.

The guides used with these hinged frames or housings *F* to turn or rotate the rod or bar may be of any of the well-known or approved forms, or such as shown in my patent before referred to—that is to say, threaded rollers mounted on shafts pivoted on the frames, (see Fig. 7;) or they may be those shown at *G* in Fig. 6, which I will here more specifically describe, as they contain points of novelty to be hereinafter claimed.

G & *G* represent guides for turning or rotating the metal between the rolls. Said guides have their faces diagonally ribbed or grooved for two-thirds, more or less, of their length, as at *g*, the diagonal ribs running in reverse direction on the two guides, so that when one edge of a bar or rod is compelled to travel upward by the groove in one guide the opposite edge of the bar will be directed downward by the groove of the opposite guide, thus compelling the desired amount of rotation or turning of the bar. The remaining portion of the faces of the guides *G* are grooved longitudinally, as at *g*¹, so that they form together a groove corresponding in form and position to the groove in the rolls which give the next pass, by which construction I steady the rod and relieve it of the twisting motion imparted to it by the faces *g*, and insure its proper entrance between the rolls.

In order that the rod or bar shall easily and properly engage with the guides, I round or curve the front ends thereof, as at *g*², so as to form a V-shaped opening when the guides are in position.

These guides *G* are set on vertical pivots *h* in the boxes *i*, and the boxes *i* are journaled or pivoted to the frame, as at *k*, by which means the guides have two motions, or can oscillate in two directions, so as to adapt themselves to the motion of the bar or rod passing between them.

In order that these or any other guides used with the swinging or pivoted frame *F* shall work to the best advantage, a relief-spring should be employed, and the same may be arranged on the guide-bearings *h* *i* *k*, if desired; but I prefer to give the relief by constructing the link *F'* that holds the housings or frames *F* as follows—that is to say, in two parts, one having a yoke or stirrup, *f*¹, through which the threaded end of the other section or rod passes, and upon which, within the yoke or stirrup *f*¹, a rubber or equivalent spring, *f*³, is held by a suitable nut, so that traction on the two sections of the link tends to com-

press the spring *f*². By altering the position of the nut the power of the relief mechanism can be adjusted at will.

I indicates a swinging guide or stripper, pivoted in or journaled on the housings *B*, the number of said strippers usually corresponding to the number of pairs of rolls or passes, and the function being to strip the metal from the roll and direct it to the guides.

K indicates a guide-bar, interposed between the bar-turning guides *G* and the rolls which give the next pass, to prevent the turning or falling back of the bar after it leaves guides *G*.

The operation of my device is as follows: The metal to be rolled, having been properly heated, is introduced between the first pair of rolls, and reduced somewhat by the first pass. It then passes through guide-box *E* and under stripper *I*, which has stripped it from the roll, to the bar-turning guides *G*. The grooves *g* of the guides *G* receive the opposite corners or edges of the bar, guiding one up and the other down, thus giving the bar one-quarter rotation, more or less, after which it enters the square formed by the longitudinal grooves *g*¹, and is prevented from further turning, and is delivered to the succeeding rolls with the portions of the bar which were at the edges of the groove in the former pass so turned as to bring them to the bottom of the groove, so that any fin formed in one pass will be worked into the bar at the next pass.

Having thus described the nature, object, and advantages of my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a metal-rolling mill, the combination, with bar-turning guides, of hinged or pivoted frames or housings for supporting said guides, substantially as and for the purpose specified.

2. In a metal-rolling mill, the combination of a spring-link with hinged housings carrying bar-turning guides, substantially as and for the purpose specified.

3. The combination of two bar-turning guides pivoted to oscillate, and having diagonal grooves upon their faces, the grooves of the opposite guides running in reverse direction, substantially as and for the purpose specified.

4. The combination of two bar-turning guides pivoted to oscillate, and having diagonally-grooved faces and curved ends, substantially as and for the purpose specified.

5. The combination of two bar-turning guides, diagonally grooved for a portion of their length and longitudinally grooved for the remainder of their length, 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:

R. H. WHITTLESEY,
F. W. RITTER, JR.