J. S. SEAMAN.

Apparatus for Rolling Metals.

No. 53,049. Patented March 6, 1866.

FIG. 2.

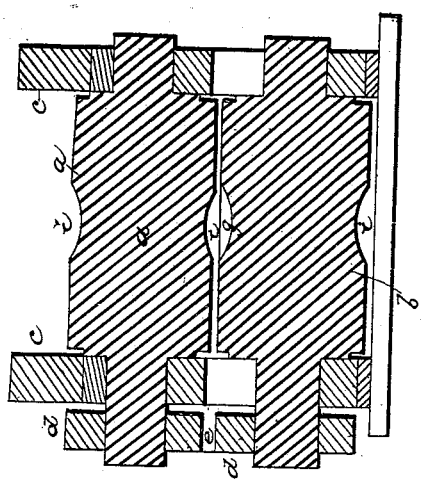


FIG. 3.

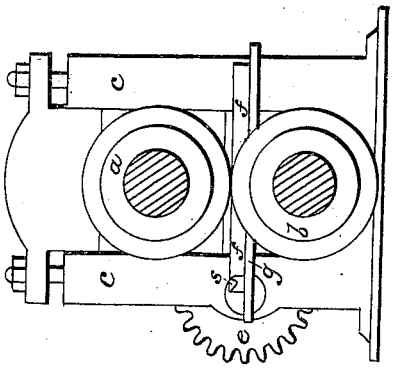
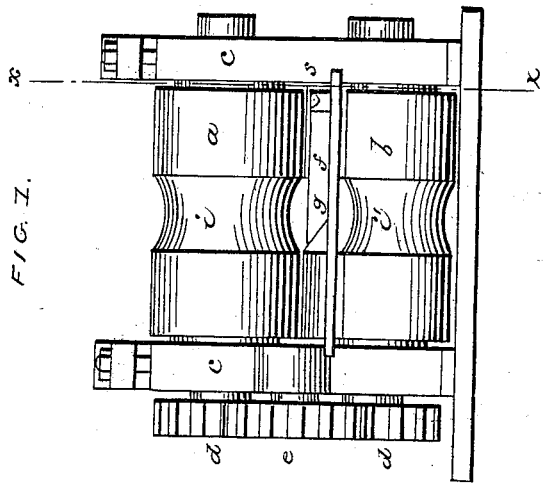


FIG. 1.



WITNESSES:

W. Lewis

Allan C. Bakewell

INVENTOR.

Joseph S. Seaman

by his attorney

W. Bakewell

UNITED STATES PATENT OFFICE.

JOSEPH S. SEAMAN, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN APPARATUS FOR ROLLING METALS.

Specification forming part of Letters Patent No. **53,049**, dated March 6, 1866.

To all whom it may concern:

Be it known that I, JOSEPH S. SEAMAN, of the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Machines for Rolling Rods or Tubes; 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 front view of my rolling machinery. Fig. 2 is a longitudinal vertical section through the axis of the rolls. Fig. 3 is a transverse vertical section through the line *x x*, Fig. 1.

In each figure like letters denote similar parts.

My improvement consists in the use of a pair of cylindrical rolls, each of which has a similar groove turned in it, the shape of the groove being that of the arc of a circle, the rolls being caused to revolve in the same direction, and the cylindrical piece of iron or other metal to be rolled being passed through between them at a horizontal angle of about forty-five degrees to the axis of the rolls, in which position it is kept by means of a channeled guide-box.

In the accompanying drawings, *a b* are a pair of cylindrical metallic rolls, which are set in the usual manner in the housings *c c*. On the neck of each of the rolls, outside of the housing-frame, is a cog-wheel, *d d'*. These cog-wheels do not gear together, but each gears into a third cog-wheel, *e*, the shaft of which has its bearing in the housing-frame. By this arrangement the two rolls *a* and *b* do not revolve in opposite directions, as a pair of rolls usually do, but in the same direction, so that if their peripheries touched each other they would not move in rolling contact, but would rub one against the other. These rolls *a* and *b* are of equal diameter at each end, but not of uniform diameter throughout their entire length, each having a similar groove, *i i'*, which extends around the roll. The shape of these grooves is that of the arc of a circle, as shown in Fig. 2, which is a longitudinal vertical section through the rolls.

It is obvious that if a straight-edge be placed across one of these rolls at right angles to its axis in the center or lowest part of the groove it will touch the roll only at a single tangential point; but if the straight-edge be turned gradually round on its tangential point as a center it will have a continually-increased length of bearing on the surface of the roll within the groove and on both sides of its original tangential point until it assumes an angle of about forty-five degrees to the axis of the rolls, when it will have its greatest length of bearing, which, if the groove be a true arc of a circle, will be a straight line. This is difficult to exhibit by a drawing, but will be readily appreciated when it is considered that the downward curve of the surface of the roll from the tangential point before referred to, in a plane at right angles to the axis of the roll, is equal to the upward curve of the groove in a plane parallel to the axis of the roll, so that a point within the groove measured a given distance from the tangential point at right angles to the axis of the roll, and thence the same distance parallel to the axis of the roll, will be level with the tangential point, and the same will be true of all points lying in a right line between these two points. If, therefore, a cylindrical rod or bar be passed between a pair of rolls thus grooved at such an angle as to have the longest possible bearing in a right line on the grooved surface of the rolls, and if such bar or rod be caused to turn on its own axis as it passes through between the rolls, it is manifest that it must of necessity be rolled straight. Both of these conditions are accomplished by my apparatus. The revolution of the two rolls *a* and *b* in the same direction causes the rod or bar, if passed between them at an angle less than a right angle to their axes, to revolve on its axis, and the rod or bar is prevented from swinging round to a position at right angles to the axis of the rolls by a guttered box or guide, *f*, which is set at the proper angle—say forty-five degrees—to the axis of the rolls, on a fore plate, *g*, the gutter or channel *s* in the box *f* having its lowest point exactly in the right line of the surface of the lower roll which it is desired that the bar to be rolled should occupy in its passage between the rolls.

When the bar to be rolled is of small diameter it will be found necessary to have the rolls *a* and *b* connected by gearing, so as to insure the regular revolution of both of the

rolls, and the consequent turning of the rod or bar on its axis; but where the rod or bar is of larger diameter the application of power to one roll will cause the revolution of the other and the turning of the rod or bar between them.

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

The use of a pair of rolls revolving in the same direction and each having a groove of the shape of the arc of a circle, in combination with a guttered guide-box or equivalent device for guiding the cylindrical rod, bar, or tube to be rolled and straightened in its passage through the groove of the rolls at the proper angle (of about forty-five degrees to the axis of the rolls) at which the rod or bar will have the longest surface bearing in a right line on the face of the rolls, for the purpose of rolling and straightening the cylindrical bar, rod, or tube, substantially in the manner hereinbefore described.

In testimony whereof I, the said JOSEPH S. SEAMAN, have hereunto set my hand.

JOSEPH S. SEAMAN.

Witnesses:

ALLAN C. BAKEWELL,

A. S. NICHOLSON.