

ARTHUR WATKIN.

Improvement in Machines for Straightening Tubes, Bars, and Shafting.

No. 125,996.

Patented April 23, 1872.

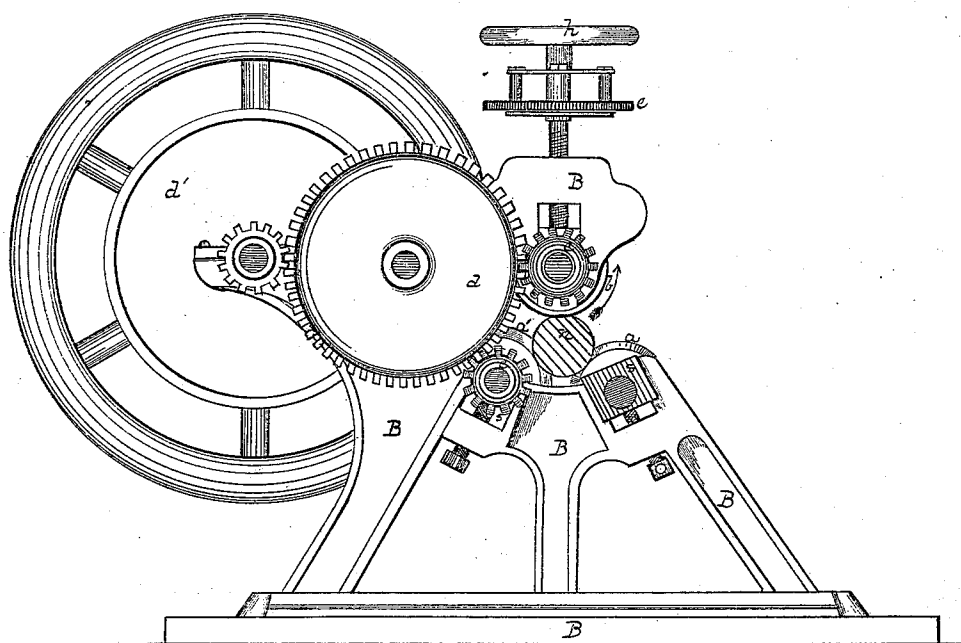


Fig. 1.

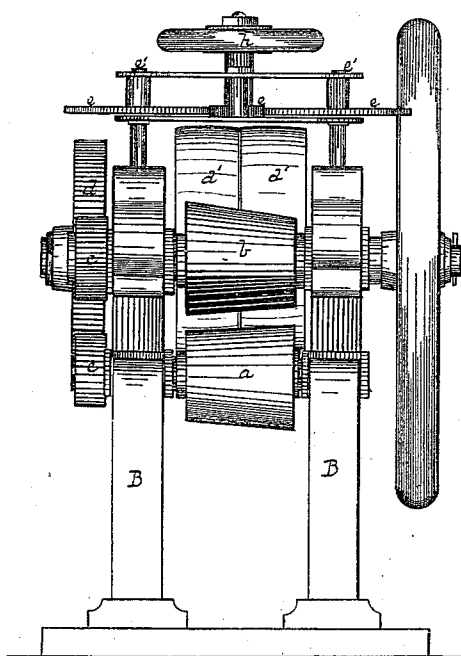


Fig. 2.

WITNESSES.

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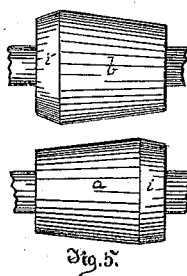


Fig. 3.

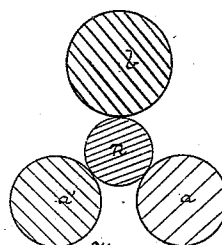


Fig. 4.

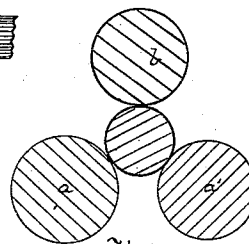


Fig. 5.

INVENTOR
Arthur Watkin,
by Batewell, Christy & Kerr,
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UNITED STATES PATENT OFFICE.

ARTHUR WATKIN, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN MACHINES FOR STRAIGHTENING TUBES, BARS, AND SHAFTING.

Specification forming part of Letters Patent No. 125,996, dated April 23, 1872.

SPECIFICATION.

To all whom it may concern:

Be it known that I, ARTHUR WATKIN, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Machine for Straightening Round Iron, Steel, Tubing, &c.; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a side elevation of my machine. Fig. 2 is a front elevation thereof. Figs. 3 and 4 are opposite end views of the conical rolls I employ; and Fig. 5 illustrates bell-mouthed rolls, interchangeable with said conical rolls.

Like letters of reference indicate like parts of each.

My improved machine is designed for straightening round iron, steel, and tubing, and finishing the surface of the same by passing it through endwise, while revolving, between three conical or tapering rolls, one of which tapers in a direction the reverse of the other two. The axes of the rolls are, preferably, parallel, but the taper is such that each roll shall take a bite along the whole or the greater part of its length on the rod or tube, and in so doing shall gradually feed it along in the direction of the axes of the rolls, as well as cause it to revolve. Any one point on the face of the rod or tube will then describe a spiral.

To enable others skilled in the art to make and use my improvement, I will proceed to describe its construction and mode of operation.

The frame-work B is of any suitable construction, such as will properly support the driving and adjusting machinery and the rolls, and leave a path open in the direction of the cavity between the rolls for feeding the rod or tube through. The two lower rolls *a a'* are of a size and taper the same, or nearly so, and are preferably mounted in their bearings *s s* so as to have their axes nearly or quite parallel. The upper roll *b* has a taper the reverse of that of the rolls *a a'*, and somewhat more abrupt, so that it will bear throughout its length on the rod or tube *n* while the latter is lying in an oblique position along the faces of the two lower rolls. The dimensions which I have found convenient for use are: Length of each

roll, twelve inches; maximum and minimum diameters of each of the rolls *a a'*, eleven and ten and one-half inches; and of the other roll *b*, twelve and eleven inches. But I do not limit myself to these dimensions, it only being essential in this respect that the rolls shall taper, two in one direction and one in the other, and that they shall be so adjusted with reference to each other that they shall bear against or bite on the rod or tube which is being passed through, through the whole or the greater part of their length, and that the periphery of the roll *b* have a more rapid motion than the periphery of the roll *a'*, or vice versa. This more rapid motion may be secured by making one larger than the other, as above set forth; or, if all three are made of the same diameter, by means of the gearing imparting to one of the geared rolls *a'* or *b* a quicker motion than to the other. Two of these rolls, *a'* and *b*, have a positive motion, which they receive, through the pinions *c c*, from the gear-wheel *d*. The other roll is operated by frictional contact with the rod or tube *n*. The bearings of the roll *b* are adjusted up or down, so as to adapt the machine to operating on rods or tubes of different sizes, by means of a hand-wheel, *h*, and gearing *e*, and the well-known screw-gear device *e' e'* ordinarily used for adjusting.

In operation, the end of the rod *n* is inserted between the rolls *a a' b*, and the upper roll *b* is set down onto it by means of the adjusting wheel and gearing. Power is then communicated in either direction from the band-wheel *d'* to the rolls *a' b*, and the rod or tube is both rotated and fed through endwise. It is thus straightened, scaled, and its surface finished. The direction of the feed I have found depends on the direction of the motion imparted to the rolls *a' b*. If they revolve in the direction indicated by the arrow, Fig. 1, the feed will be toward the larger end of the roll *b*, and vice versa. As all three rolls take a bite on the rod or tube throughout the whole or the greater part of their length and cause it to revolve, they thereby co-operate to straighten it; and the difference in the diameters of the upper and lower rolls at corresponding points each way from the vertical plane of uniform diameter, or the difference in speed imparted to one of the geared rolls, if the rolls be of the same size, results in a rubbing motion on the face of the

rod or tube, which effectually removes the scale, and the rod or tube is delivered by the endwise feed in proper condition for market.

Besides the rolls described, I also propose to use sometimes bell-mouthed rolls, as illustrated in Fig. 5. In the lower rolls *a a'*, as shown in Fig. 5, each larger end has a reverse taper, *i*, which, in connection with the corresponding taper of the smaller end of the upper roll *b*, forms a bell-mouth, into which the end of the rod or tube *n* may be inserted, so that the rolls shall take a bite thereon and gradually, while rotating it, cause it to advance endwise between the rolls. If the rolls are furnished with this bell-mouthed feeding appliance the adjusting-gear, for raising and lowering the upper roll, will be seldom used, except for the purpose of adjusting the machine to operate on rods or tubes of different diameters.

The bell-mouth device described may be made on the other end of the rolls, if so preferred, by making a reverse bevel on the larger end of the upper roll *b*, as at *i'*; or it may be made at both ends of the rolls, if so desired.

I have described the roll *b*, which has the more abrupt taper, as the upper roll. This roll may change places with the roll *a'*, it only being essential in this respect that one of the rolls of less taper, and the roll of the greater taper, have each a positive motion, such that the operative face of one shall have a more rapid motion than the operative face of the other.

The arrangement of the three conical rolls may be modified to some extent without departing from the scope of my invention. For example, all three rolls may have the same taper and be of the same size, provided one of the three be so set that, while its axis is not

parallel with the axes of the other two, it shall take a bite or bearing throughout the whole or the greater part of its length on the rod or tube; and in such case, being out of line with the others, it would have to be driven by a separate gear, and, in order to secure the forward through feed, one at least of the two geared rolls should have a quicker positive motion than the other.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of three conical or tapering rolls, the direction of the taper of one being the reverse of that of the other two, and the three being set so as to take a bite through the whole or the greater part of the length of their rolling surfaces on the rod or tube, substantially as set forth.

2. In combination with the tapering rolls *a a'*, a roll *b*, having a reverse and more abrupt taper, substantially as and for the purposes set forth.

3. In combination with three conical or tapering rolls, a bell-mouth entrance-feed at either end, substantially as set forth.

4. In combination with a pair of tapering rolls, *a a'*, one of which is geared, a geared tapering roll, *b*, the periphery of which has a positive motion more or less rapid than the periphery of the geared roll, substantially as and for the purposes set forth.

In testimony whereof I, the said ARTHUR WATKIN, have hereunto set my hand.

ARTHUR WATKIN.

Witnesses:

A. S. NICHOLSON,
G. H. CHRISTY.