2 Sheets—Sheet 1.

C. H. PERKINS.

ROLLING-MILL.

No. 170,449. Patented Nov. 30, 1875.

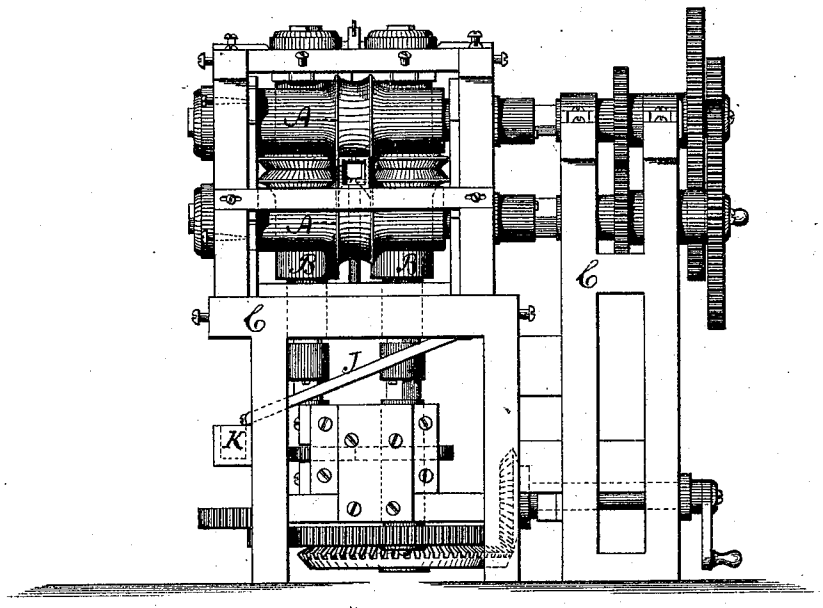

FIG. 1.

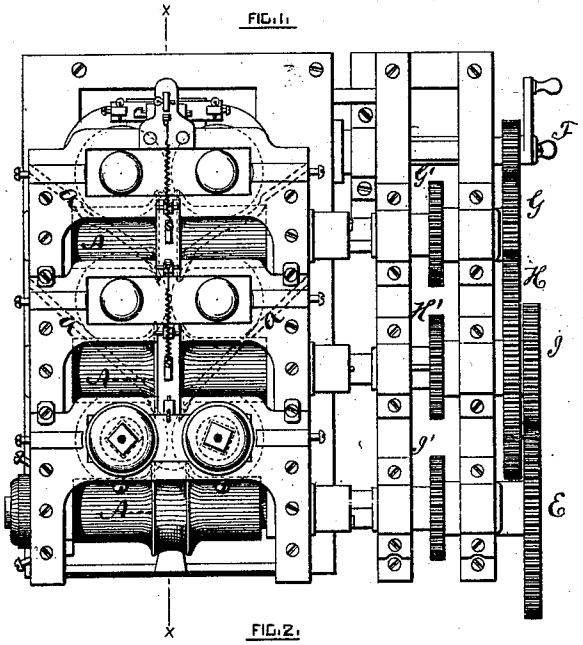

FIG. 2.

WITNESSES.

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2 Sheets—Sheet 2.

C. H. PERKINS.

ROLLING-MILL.

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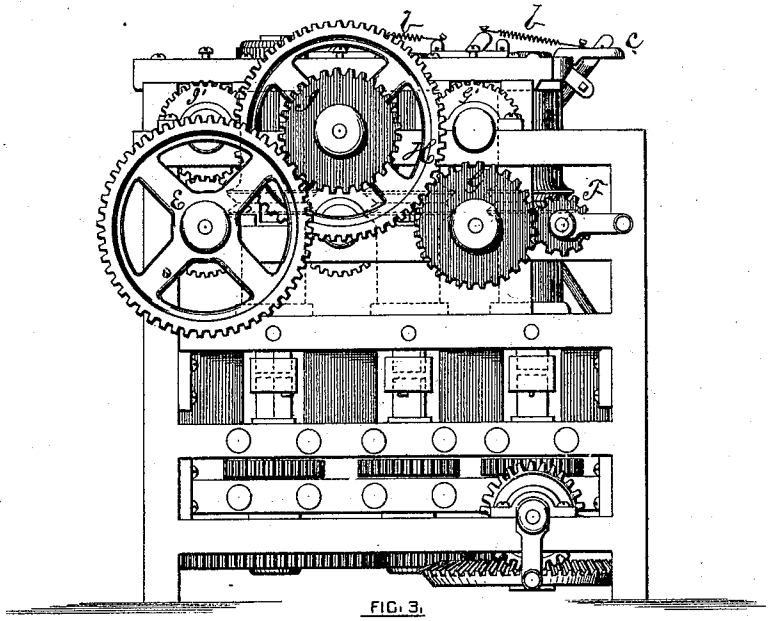

FIG. 3.

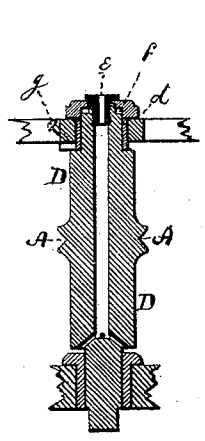

FIG. 5.

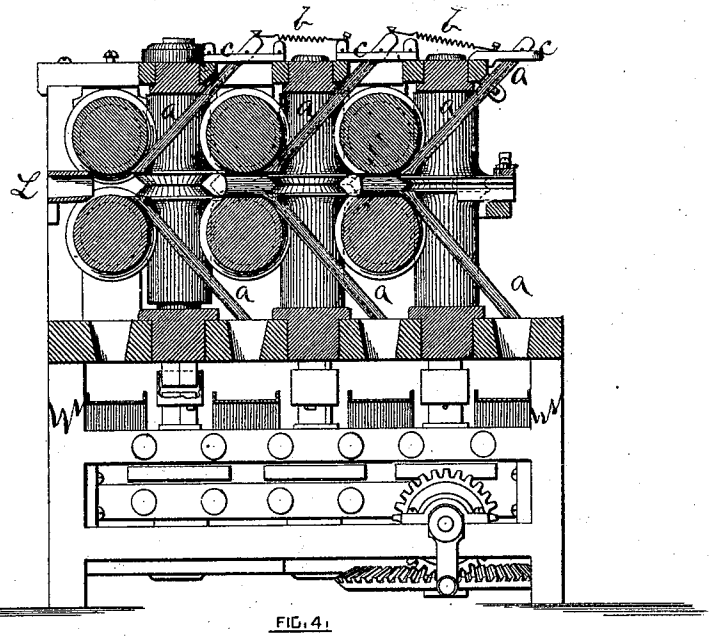

FIG. 4.

WITNESSES.

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UNITED STATES PATENT OFFICE.

CHARLES H. PERKINS, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN ROLLING-MILLS.

Specification forming part of Letters Patent No. **170,449**, dated November 30, 1875; application filed January 12, 1874.

To all whom it may concern:

Be it known that I, CHARLES H. PERKINS, of the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Rolling-Mills; and I do hereby declare that the following specification, taken in connection with the drawings making a part of the same, is a full, clear, and exact description thereof.

Figure 1 is an end view. Fig. 2 is a top view. Fig. 3 is a side view. Fig. 4 is a longitudinal section on the line *x x* of Fig. 2. Fig. 5 is a longitudinal section of one of the rolls, and means for adjusting the same.

The several pairs of rolls A A B B are arranged alternately horizontally and vertically, and each roll is set in housings, and is capable of adjustment longitudinally in a novel manner hereinafter to be explained, in addition to the usual means for adjustment to bring their acting faces in proper relation to each other. C is a suitable frame-work of iron, for sustaining the several sets of rolls, and the gearing for driving them.

In my improved mill I employ rolls of a form not new, which, at the score or roll proper, have a much greater diameter than their shafts, as represented in Fig. 5 at A and D; and each pair of such rolls are so combined with the next adjacent pairs that the fagot or bar to be rolled shall be surely guided from one pair to the next in the series, and so that when a pair of vertical and horizontal rolls are set in proper relation, as seen at Fig. 4, the acting scores will, by their projection beyond their shafts, be brought much closer together than would be possible if the scores were cut in a cylindrical roll of the same diameter throughout. In combination with each roll of both the horizontal and vertical series guards *a* are placed so as to bridge over and inclose on all sides (with the exception of an opening for the passage of scale,) the space between any two contiguous rolls. These guards are all similar in construction, and consist of a bar of iron having a head set at an angle of about forty-five degrees with the bar, and shaped conformably with the groove or score in the roll and the space between it and the next pair, so as to insure the guiding of the metal from one set of rolls to the next in the series. The guards are set obliquely, as shown at Figs. 2 and 4, resting at their heads in the grooves of the rollers, their foot-bearing being in sockets in the frame-work. The upper guards of the horizontal rollers are held up against the scores of the rolls by springs *b*, and their end bearings are pivot-bolts in the plates *c*. The guards, in combination with the rolls as constructed, and their arrangement in a series, constitute a complete guide for the metal which is being rolled.

Referring to Fig. 3, F is the prime mover, the teeth of which engage with the teeth of the gear-wheel G, and drive the lower roll of that pair, on the shaft of which is a pinion, G′, Fig. 2, which engages with another of the same diameter on the shaft of the upper roll of the same pair. The gear-wheel G drives the gear-wheel H, and gives the proper reduced speed to the upper roll of the next pair, upon whose shaft is a pinion, H′, Fig. 2, which engages with another of the same diameter on the shaft of its fellow lower roll. Upon the same shaft with the gear-wheel H is the gear-wheel I, which gives the proper reduced speed to lower roll of the next pair by means of the gear-wheel E, and a pinion, I′, Fig. 2, on its shaft engages with another of the same diameter on the shaft of its fellow upper roll; and this arrangement is preserved throughout the entire series of rolls employed. This system of gearing has been heretofore employed.

The series of vertical rollers are driven by a similar arrangement of gearing as exhibited at Figs. 3 and 4, with the difference only that the movement of the first pair of rolls is communicated by bevel-gears. By thus connecting the lower roll of the quickest-moving pair with the upper roll of the next in the series, and this with the lower roll of the next, and so on throughout the entire series, all the pairs of rolls connected by the train are made to revolve in the right directions with the least possible number of gear-wheels, and with the avoidance of intermediate gears. All the rolls are capable of being adjusted endwise from one side of the machine, as shown at Fig. 5. For this purpose each roll is provided with a cap, *d*, which is held to the roll by means of a strong screw, *e*. The under side of the cap has a cavity, *f*, of the same diameter as the

shaft of the roller. The journal of the roll-shaft is longer than the journal-bearing, and check-screws *g*, inserted diagonally through the frame, bear against a lip on the journal-boxes. These check-screws *g* and the screws *e* in the ends of the roll work in opposition to each other. By slackening the check-screws and turning the screw *e* to the right, or by turning the check-screws to the right, and slackening the screw *e*, the roll can be adjusted endwise without difficulty.

The scale which falls from the several pairs of rolls drops into troughs J, Fig. 1, by which it is conveyed and discharged into a box or receptacle, K, for the same, located on one side of the machine. The fagot to be rolled is introduced into the guide L. It is seized by the first pair of rolls, and is carried through the several pairs consecutively in a well-understood way.

I do not claim as new the combination of pairs of horizontal and vertical rollers alternately in a series, nor the form of the rolls shown, nor the system of gearing described; but

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

1. The combination of the guards *a* with rolls having rolling faces or grooves in a portion thereof, which is of greater diameter than that of their shafts, arrranged in pairs alternately horizontal and vertical, substantially as described.

2. The means for adjusting the rolls of a rolling-mill, which consists in the combination, with the roll, of the recessed cap *d*, the screw *e*, and the check-screw *g*, substantially as described.

CHARLES H. PERKINS.

Witnesses:
ORRIN L. BOSWORTH,
JOHN B. GRINNELL.