F. HICKMAN.

SCREW GEARING FOR ROLLING-MILLS.

No. 195,130. Patented Sept. 11, 1877.

Fig. 1.

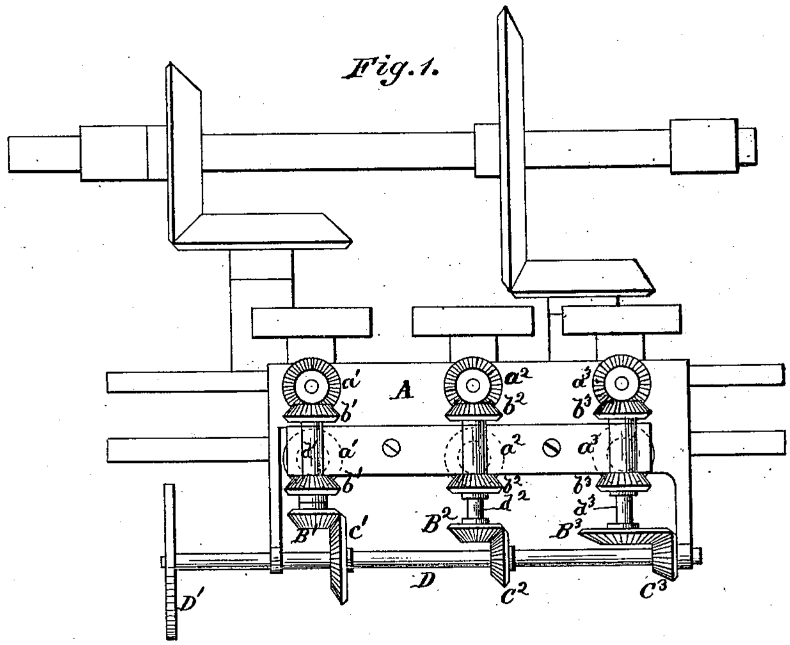
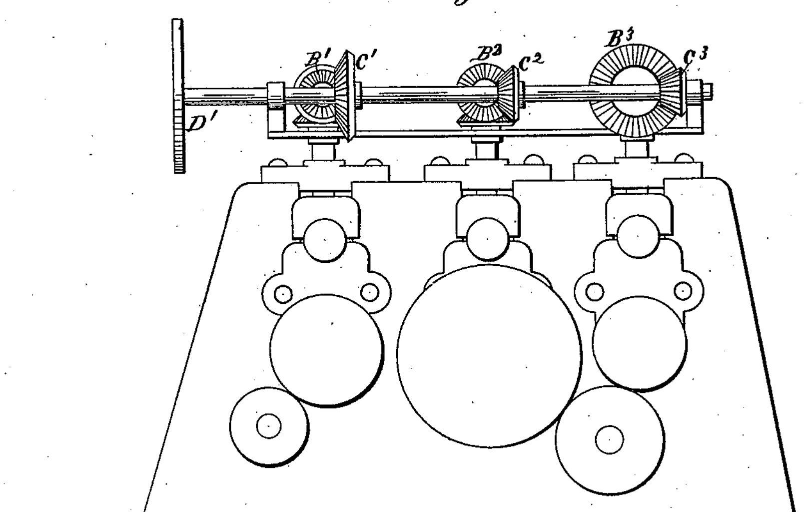


Fig. 2.



WITNESSES

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FRANCIS HICKMAN, OF READING, PENNSYLVANIA.

IMPROVEMENT IN SCREW-GEARING FOR ROLLING-MILLS.

Specification forming part of Letters Patent No. **195,130**, dated September 11, 1877; application filed May 17, 1877.

To all whom it may concern:

Be it known that I, FRANCIS HICKMAN, of Reading, in the county of Berks, and in the State of Pennsylvania, have invented certain new and useful Improvements in Screw-Gearing for Rolling-Mills; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

My invention relates to that class of rolling-machines where there are two or more sets of rolls set at different distances apart; and it consists in an improved screw-gearing for setting or adjusting the rolls all at the same time, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, in which—

Figure 1 is a plan view of a rolling-machine embodying my invention. Fig. 2 is a side elevation of the same.

A represents the frame of a rolling-machine containing three sets of rollers, the upper roller of each set being adjusted up and down by means of screw-shafts to increase or diminish the distance between it and the bottom rollers.

In the drawing, a^1 a^1, a^2 a^2, and a^3 a^3 represent bevel-gear wheels secured, respectively, on the upper ends of said screws for the three sets of rollers. These gear-wheels mesh with corresponding bevel-gear wheels b^1 b^1, b^2 b^2, and b^3 b^3, secured on three shafts, d^1, d^2, and d^3, located on top of the mill.

On the ends of these shafts are respectively secured bevel-gear wheels B^1 B^2 B^3, which gradually increase in diameter, as seen in Fig. 1, and mesh with similar bevel-gear wheels, C^1 C^2 C^3, which decrease in diameter in corresponding proportion. The wheels C^1 C^2 C^3 are all secured on one long shaft, D, provided at one end with a hand-wheel, D^1, for turning the same.

It will readily be seen that by turning the shaft D the wheels a^1, a^2, and a^3 will be actuated at different rates of speed, and hence their respective rollers lowered or raised at varying distances.

In a universal rolling-machine, where the billets or bars to be rolled are of varying sizes or thicknesses, it is necessary to change the bite or gripe of the rolls in order that each succeeding pair of rolls shall reduce or lengthen the bar just in proportion as the speed of the next rolls take it up. Consequently, when the distance between the first pair of rolls is changed to take in a smaller billet, the next or second pair of rolls must be changed proportionately, or the bar would come from the second pair of rolls faster than the third pair would take it up, it being borne in mind that in a universal rolling-machine the speeds at which the various sets of rolls travel are in proportion to the reduction of the iron, and the reduction of the iron by each set of rolls is in proportion as the speed of the next succeeding rolls will take up.

My arrangement of screw-gearing is designed to facilitate or simplify the setting of screws in rolling-machines, as without it it would be necessary to use a gage for every set of rolls, and set them one at a time.

If, for instance, in a machine having three or more sets of rollers, it is desired to move or set the first pair of rollers one inch closer, the last pair will move but one-third that distance, or approximately so much, and the intermediate pairs of rolls in proportion. This is accomplished by the varying size of the gear-wheels on the shafts D and a^1 a^2 a^3. The shaft D being rotated, the gear-wheels C^1 B^1 will, of course, rotate the shaft a^1 faster than the shaft a^2 is rotated by the gear-wheels C^2 B^2, and this shaft a^2 is rotated faster than the shaft a^3 by the gear-wheels C^3 B^3; and as the gear-wheels b^1 b^2 b^3 on the shafts a^1 a^2 a^3 are of uniform size, it follows that the screws operated by the said wheels b^1 b^2 b^3 will be turned at different rates of speed, thus bringing all the rolls together at the same time.

When more than two sets of rolls are used the arrangement of gearing is according to the speed of the rolls, and their distance apart. Thus, say the first pair of rolls are one inch apart, the second pair three-fourths of an inch, and third pair one-half inch. Consequently, to bring the rolls all together at the same time, the screws of the first rolls would have to move just twice as fast as the screws of the third pair of rolls, while the speed of the screws of the second pair of rolls would be between that of the first and third.

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

In a rolling-mill having two or more sets of rolls at varying distances apart, the combination, with the gears a^1 a^2 a^3 on the screws of the upper rollers, the shafts d^1 d^2 d^3, having gears b^1 b^2 b^3, and the gears B^1 B^2 B^3 of varying diameter, and the single shaft D with gears C^1 C^2 C^3 of varying diameter, substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 7th day of May, 1877.

FRANCIS HICKMAN.

Witnesses:
FRANK GALT,
F. M. BANKS.