(No Model.) 2 Sheets—Sheet 1.

E. S. LENOX.

ROLLING MILL FOR MAKING WIRE RODS.

No. 351,841. Patented Nov. 2, 1886.

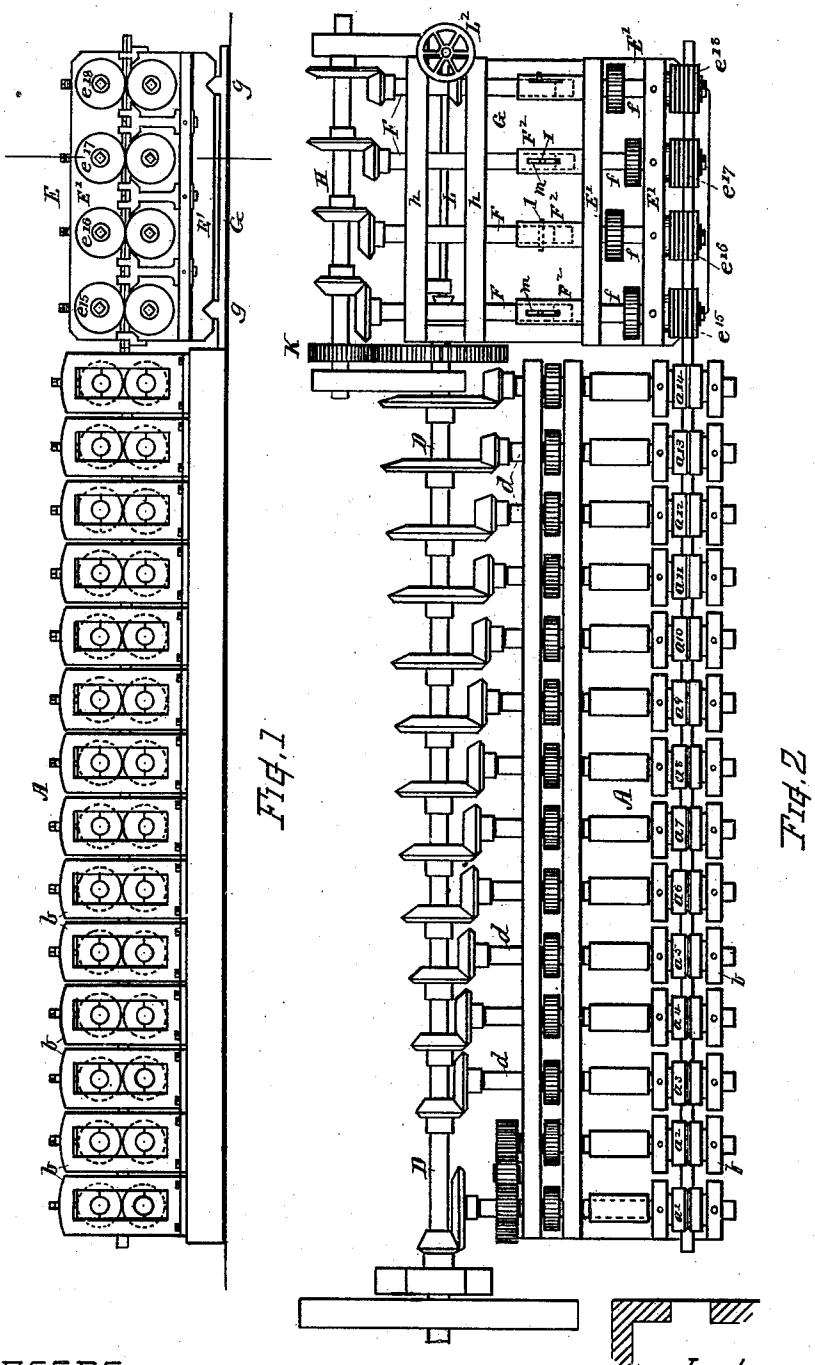


Fig. 1

Fig. 2

WITNESSES

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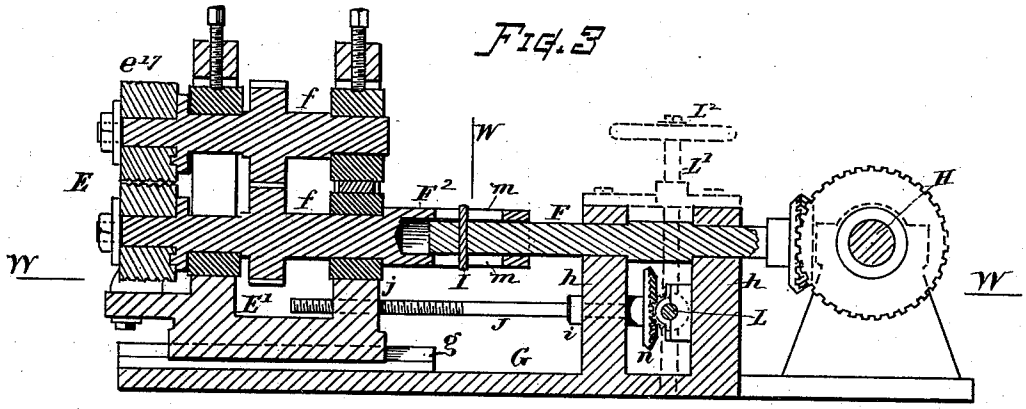
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Fig. 3



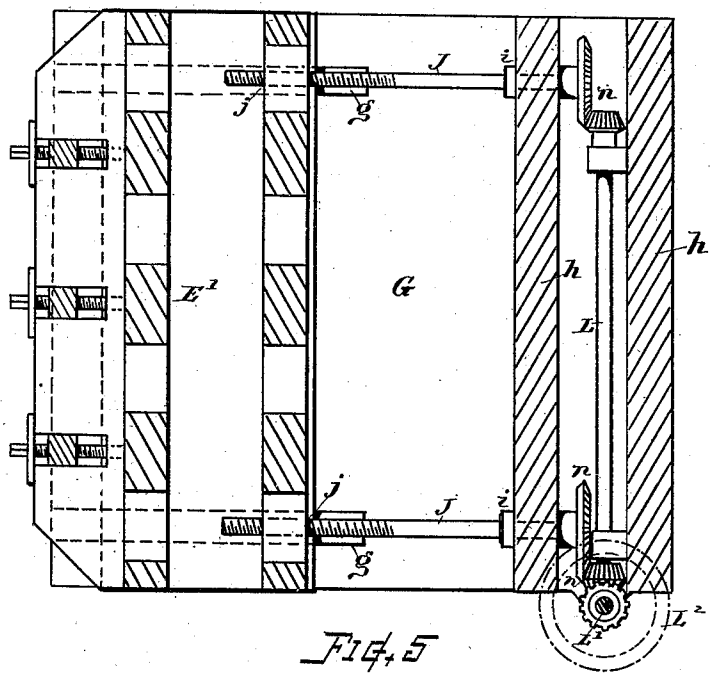


Fig. 5

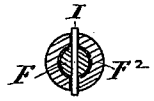


Fig. 4

WITNESSES

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UNITED STATES PATENT OFFICE.

EDWIN S. LENOX, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE WASHBURN & MOEN MANUFACTURING COMPANY, OF SAME PLACE.

ROLLING-MILL FOR MAKING WIRE RODS.

SPECIFICATION forming part of Letters Patent No. 351,841, dated November 2, 1886.

Application filed February 23, 1886. Serial No. 192,816. (No model.)

To all whom it may concern:

Be it known that I, EDWIN S. LENOX, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Continuous Rolling-Mills for Making Wire Rods, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

The object of my present invention is to provide a "continuous" rolling-mill for rolling wire rods, wherein the latter series of rolls (of say, four to eight pairs) are mounted on a frame or carriage movable on the gear-shaft supporting bed or platform, and are arranged to be simultaneously laterally adjustable in relation to the preceding series of rolls, and also arranged with overhanging rolls and telescoping driving-shafts; also, to provide a relievable power-transmitting connection or safety coupling-pin in the telescoping roll-driving shafts, wherein the pin is adapted to transmit power and motion to the rolls under the nominal conditions of reducing the rods, and to give way or break the connection and permit the rolls to stop when submitted to abnormal strains; also, to provide, in combination with the laterally-movable roll-supporting frame and gear-shaft-supporting bed, a convenient mechanism for effecting the lateral adjustment of the series of overhanging rolls in simultaneous and parallel order, as hereinafter explained.

In the drawings, Figure 1 is a front view of a continuous rolling-mill illustrating my invention. Fig. 2 is a plan view of the same. Fig. 3 is a transverse section of the latter part of the mill at line *x x* on Fig. 1, on larger scale. Fig. 4 is a transverse section of the roll-driving shaft at line *w* on Fig. 3; and Fig. 5 is a horizontal section at line *y y* on Fig. 2, showing the bed-platform and adjusting device for the roll-supporting frame.

In my improved rod-rolling mill I arrange a breaking-down section or series, A, of fourteen pairs of rolls, (marked a' to a^{14},) which are provided with journals at each end and mounted in pairs in separate housing-frames *b*, of the kind usually employed for continuous rod rolling mills. These series of rolls are also geared and coupled in usual manner to driving-shafts *d*, which in turn are geared to receive their proper speed and motion from the main driving-shaft D at the back of the machine, which latter shaft is operated by a suitable engine. (Not shown.) The guides between the several pairs of rolls in the series A may be such as ordinarily employed in continuous rolling-mills.

At the foot or latter end of the series of rolls a' to a^{14}, and operated in continuous order therewith, I arrange a series, E, of, say, four pairs of rolls, (marked e^{15} to e^{18},) which are fixed on the overhanging ends of shafts *f f*, the journals of which are supported in bearings on a carriage or frame, E', common to all and movable on lateral guides *g*, connected with the bed or platform G, that supports the bearing of the driving-shaft F and H, whereby this series of overhanging rolls is operated. The overhanging rolls are fitted to their shaft *f* with an interlocking lug, pin, or key and a retaining collar and nut, so that they can be readily taken off and put onto the shafts, and are furnished with any desired number of grooves in their working-faces. The upper and lower shafts, *f*, are connected by gears to operate the upper and lower rolls in unison, and one of said shafts in each pair is made with a tubular extension, F^2, that receives the end of the driving-shaft F, which telescopes therewith in the manner illustrated in Fig. 3. The shafts F are journaled in bearings *h*, stationary on the bed or platform G. The tubular extension F^2 is provided with a longitudinal slot, (or slots,) *m*, and a pin, I, is fitted in an opening through the shaft F, which projects outward through the slot for transmitting the power and motion from the shaft F to the shafts *f f* and rolls. This pin I is made of sufficient strength to resist the normal strain required for transmitting the power for operating the rolls under ordinary conditions in reducing the rods, but at the same time weak enough to break or give way under any extraordinary strain or abnormal condition—as the choking of the roll-pass—so that in the event of the rod becoming "cobbled" in front of any

pair of the rolls in the series E, such pair of rolls will, by the giving way of the pin I in its driving connection, cease to operate, and the succeeding portion of the rod will be discharged or thrown out in a loop from between the pairs of rolls at the front of the mill, where it can be seized, cut off from the cobbled end, and reeled up for further treatment, instead of being wound and jammed in among the rolls, thus avoiding waste and saving time and delay that would be required for working a heavy snarl or cobble out from among the rolls.

The back shaft H at the latter part of the mill, is offset from the back shaft D of the first part of the mill, and the two shafts are geared to each other at K by spur-gears, which give increased speed to the shaft H, thus providing for the high speeds of the latter rolls in the mill without requiring so great diametrical difference between the bevel-gears and pinions which transmit the movement from shaft H to shafts F, thereby enhancing the running and wearing qualities of the gearing.

The movable carriage or roll-supporting frame E′ is connected with the stationary bed G by screw-threaded shafts J J, located at or near the respective ends thereof, as indicated, one end of said shafts J being journaled in and confined by collars to the upright standards, as at *i*, and the other ends fitted to screw-threaded openings in connection with the carriage-frame, as at *j*. A shaft, L, disposed at right angles to shaft J, and connected therewith by beveled gears *n n*, serves to simultaneously revolve both of the screw-shafts, and an upright shaft, L′, having a hand-wheel, L^2, and connected with shaft L by worm or bevel-gearing, enables the operator to work the adjusting-screws for moving the carriage E′, to effect lateral adjustment of the series of rolls E, simultaneously and in parallel order.

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

1. A continuous rod-rolling mill having a series of rolls—viz., four to eight pairs—which work the smaller sections of the wire rod, mounted upon and detachably retained in connection with the overhanging ends of rotating shafts, which are supported in bearings or housings that are laterally adjustable in series, substantially as set forth.

2. A wire rod-rolling mill having a breaking-down section consisting of a series of double-journaled rolls, and a finishing-section consisting of a series of overhanging rolls, the two sections being disposed to operate in continuous order.

3. In a wire-rod-rolling mill, the combination, with the overhanging rolls, their operating-shafts, and the driving-gear shaft, of the telescoping sleeve having a slot, and the pin arranged through the shaft to project into said slot, and adapted to break or give way under abnormal strains, as hereinbefore set forth.

4. A continuous rolling-mill having the series of rolls which form the small sections of wire rod overhanging and mounted upon a carriage that is movable laterally upon the bed or platform upon which the driving-gear shafts are mounted.

5. The combination, with the laterally-movable carriage supporting the series of rolls which form the small sections of rod, of screw-shafts connecting the respective ends of said carriage with the stationary bed, and an operating-shaft and gearing for simultaneously rotating said screw-shafts, as hereinbefore described.

Witness my hand this 11th day of February, A. D. 1886.

EDWIN S. LENOX.

Witnesses:
CHAS. H. BURLEIGH,
S. R. BARTON.