No. 767,314. PATENTED AUG. 9, 1904.

J. SANDNER.

ROLLING MILL.

APPLICATION FILED OCT. 14, 1902.

NO MODEL.

Fig. 1.

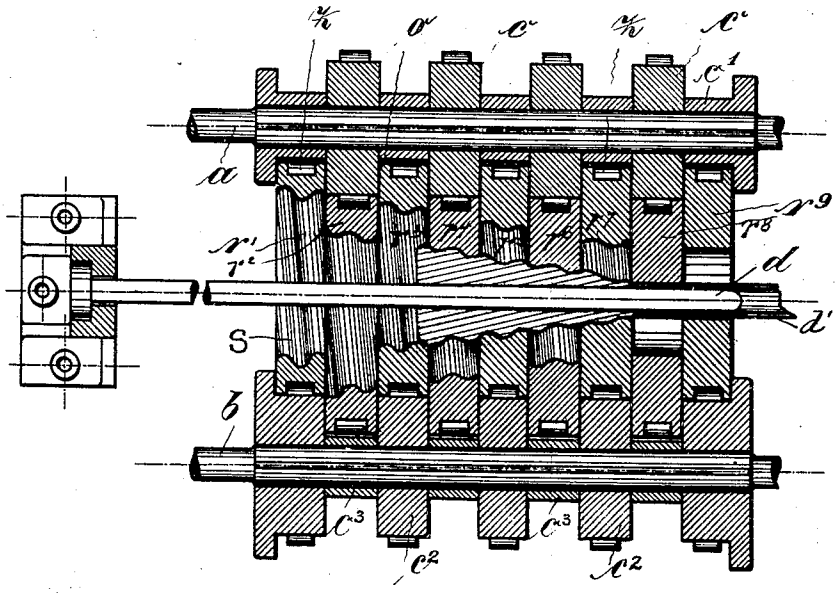
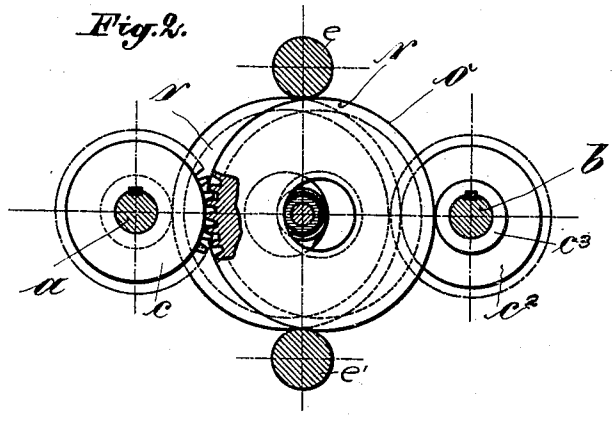


Fig. 2.



Witnesses:
Arthur Zumpe.
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No. 767,314. Patented August 9, 1904.

UNITED STATES PATENT OFFICE.

JOHANN SANDNER, OF DÜSSELDORF, GERMANY, ASSIGNOR TO ANTON RICHARD, OF DÜSSELDORF, GERMANY.

ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 767,314, dated August 9, 1904.

Application filed October 14, 1902. Serial No. 127,219. (No model.)

To all whom it may concern:

Be it known that I, JOHANN SANDNER, a citizen of Germany, residing at Düsseldorf, Germany, have invented certain new and useful Improvements in Rolling-Mills, of which the following is a specification.

This invention relates to an improved mill for rolling iron and steel blocks into bars or tubes of superior density.

In the accompanying drawings, Figure 1 is a horizontal section through the operative part of a rolling-mill embodying my invention; and Fig. 2, an end view, partly in section, of the same.

The letters a and b represent two parallel shafts, which are driven in suitable manner. Upon shaft a are mounted a series of gear-wheels c, that alternate with idlers c' of less diameter. Upon the shaft b are mounted a similar set of gear-wheels c^2 and intermediate smaller idlers c^3. The relative arrangement is such that the gear-wheels c of shaft a are placed opposite the idlers c^3 of shaft b, while the idlers c' are placed opposite the gear-wheels c^2. The teeth of the gear-wheels c c^2 project outwardly and are arranged centrally upon the periphery of the wheels, so as to be flanked by two smooth or cylindrical rims, as shown.

Intermediate the shafts a and b are arranged a series of parallel rolling-rings r' r^9, of which alternate rings r' r^3, &c., are driven by the gear-wheels c^2 of shaft b and impinge against the idlers c' of shaft a, while the intermediate rings r^2 r^4, &c., are driven by the gear-wheels c of shaft a and impinge against the idlers c^3 of shaft b. The rings r' r^2, &c., are each provided with countersunk peripheral teeth z, flanked by smooth or cylindrical rims o. In this way the rings will be intergeared with the driving-wheels c c^2 in such a manner that the pressure is taken off their teeth and transmitted to their rims.

In order to center the rolling-rings r' r^2, &c., and prevent their vertical displacement I provide a pair of guide-rollers e e', Fig. 2, which are arranged above and below the rings, respectively, and are adapted to contact with the same.

Owing to the different diameters of the driving-wheels and idlers upon the shafts a and b, the alternating rings r' r^3, &c., will approach the shaft a more closely than the intervening rings r^2 r^4, &c. In like manner rings r^2 r^4, &c., will approach the shaft b more closely than the intervening rings r' r^3, &c. Each of the rings r' r^2, &c., is provided with a central opening, which is in this way partly overlapped by the opening of the adjoining ring to form a draw-hole, which is of approximately oval shape, as indicated in Fig. 2.

The diameters of the openings in the rolling-rings r' r^7 gradually diminish from left to right, while the surface of such openings tapers in the same direction, so that a coniform draw-hole is obtained. At its circumference each of the openings is provided with a thread or spiral corrugation s, which serves to feed the metal through the mill. The height of this corrugation gradually diminishes from the first toward the last ring, so that the rings jointly form a passage having a gradually flattening or vanishing thread. The last two rings, r^8 and r^9, are preferably made with smooth cylindrical openings and constitute finishing-rollers.

As thus far described, the mill is adapted for rolling bars. If it is designed for rolling tubes, a mandrel d is centered between the shafts a and b by being secured to a suitable support d'.

The operation is as follows: The shafts a and b are rotated to turn the rings r' r^2, &c., by means of the gear-wheels c c^2, and the hot metal A is introduced into the ring r' having the draw-hole of greatest diameter. The thread s will during the rolling operation form a corresponding groove or corrugation in the metal and will thus feed the same through the draw-hole. Owing to the gradual flattening of the thread, this corrugation will be obliterated before the finished product leaves the mill.

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

1. In a rolling-mill, a series of pairs of parallel overlapping rings arranged to form a progressively-reduced opening, in combination with oppositely-placed driving-wheels engaging said rings, substantially as specified.

2. In a rolling-mill, a series of pairs of parallel overlapping toothed rings arranged to form a progressively-reduced opening, in combination with a pair of shafts, wheels on said shaft engaging alternate rings, and idlers between the wheels, substantially as specified.

3. In a rolling-mill, a series of pairs of overlapping rings having a gradually-flattening internal thread arranged to form a progressively-reduced opening, combined with oppositely-placed driving-wheels engaging said rings, substantially as specified.

4. In a rolling-mill, a series of pairs of overlapping rings having a gradually-flattening internal thread arranged to form a progressively-reduced opening, combined with a mandrel within the rings, and oppositely-placed driving-wheels engaging the rings, substantially as specified.

Signed by me at Düsseldorf, Germany, this 1st day of October, 1902.

JOHANN SANDNER.

Witnesses:

WILLIAM ESSENWEIN,

PETER LIEBER.