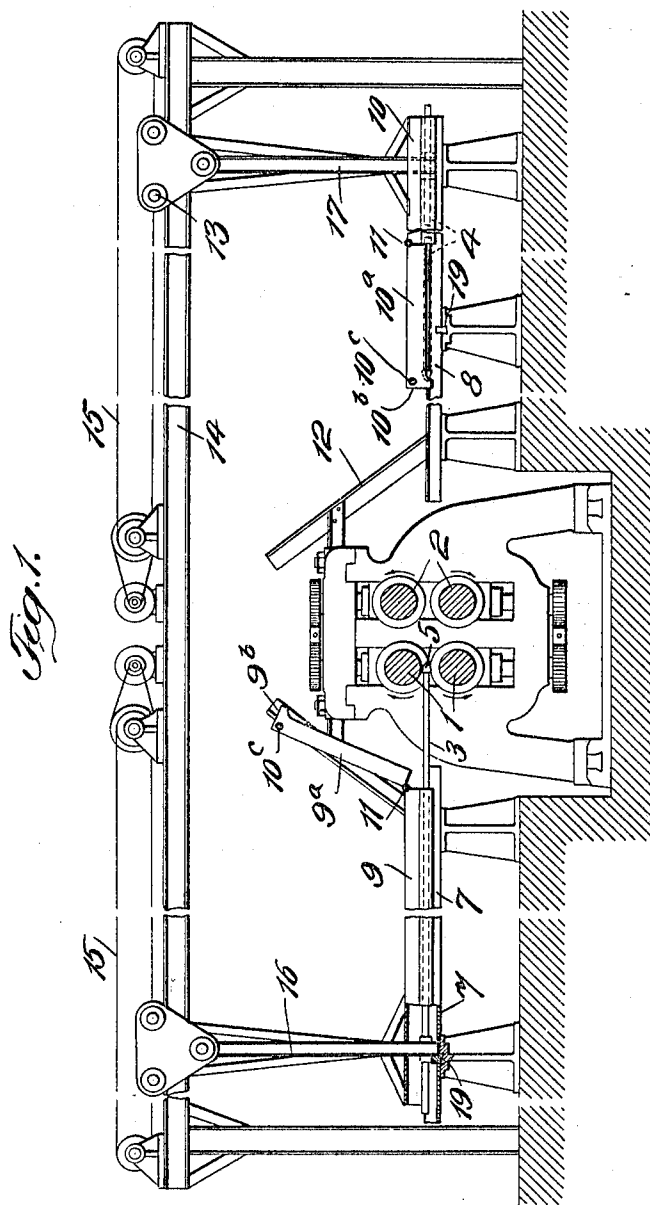


M. KOCH.
TUBE ROLLING MILL.
APPLICATION FILED SEPT. 7, 1911.

1,048,547.

Patented Dec. 31, 1912.

2 SHEETS—SHEET 1.

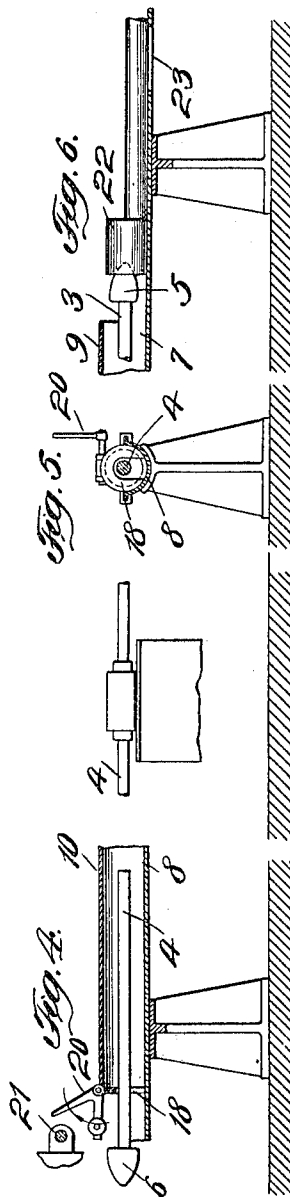


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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

MAX KOCH, OF RATINGEN, GERMANY.

TUBE-ROLLING MILL.

1,048,547.

Specification of Letters Patent.

Patented Dec. 31, 1912.

Application filed September 7, 1911. Serial No. 648,154.

To all whom it may concern:

Be it known that I, MAX KOCH, a subject of the German Emperor, and a resident of Ratingen, Kingdom of Prussia, Germany, have invented a new and useful Tube-Rolling Mill, of which the following is a specification.

The present invention relates to novel means for advancing and withdrawing the mandrel rod and for feeding the charge in tube rolling mills.

The essential feature of the present invention consists in that with roller mills having two sets of rolls next to each other and working alternately and in opposite directions and mandrels on both sides, the mandrel is advanced into operative position and the work piece is fed into the respective set of rolls by one and the same operation and by the same mechanism, which serves to again withdraw the mandrel after the completion of the rolling operation.

In the accompanying drawing: Figure 1 is a side elevation of my improved rolling mill, showing the rolls in section; Fig. 2 an enlarged longitudinal section through one of the guides; Fig. 3 a cross section therethrough; Fig. 4 a longitudinal section through a modification of one of the guides; Fig. 5 a cross section therethrough, and Fig. 6 a longitudinal section through a further modification.

The pairs of rolls 1 and 2 are approached to and removed from each other in known manner, so that always one pair will be in operative position and the other in opened position, the latter in consequence thereof affording a clear passage for the work piece. In the constructional form exemplified in the accompanying drawing the pair of rolls 1 on the left will roll toward the left, and the pair of rolls 2 on the right toward the right. As shown in the drawing, trough-shaped guide races 7 and 8 are provided on both sides of the rolling mill, on which races rams or plungers 9 and 10 are provided for pushing the work piece. These plungers are hollow and serve at the same time to inclose, together with the races, the mandrel rods 3 and 4 either wholly or to their greater part, if necessary together with the mandrel proper and to receive the work piece moved by the working rolls, so that this work piece cannot bend aside. The rams may be made of a V-shaped or any other suitable section. In the constructional

form according to Fig. 1, the foremost parts of the rams 9^a and 10^a are made to move on a hinge 11 and on the roll-housings inclined guide rails 12 are provided next to the races. The mandrels and rams may be operated either by hydraulic or pneumatic pistons or by electric or any other suitable means.

In the constructional form shown in the drawing the hollow rams and the mandrel rods are advanced by means of arms 16 and 17 guided by rollers 13 along rails 14 and drawn by wire cables 15. These arms are connected below both to the mandrel rods and the rams. When the arm 17 is moved toward the roll housing the work piece lying in the race in front of the end wall 10^b of the ram 10 will be pushed between the pair of rolls 1 and against the mandrel 5 behind them. It is seized by the rolls 1 and rolled over the mandrel 5. In the meantime the arm 17 has advanced the ram 10 with the mandrel 6 so far, that the projection 10^c provided on the side of the ram abuts against the inclined guide rail 12, so that on the ram being further advanced its foremost part or head 10^a, swinging on hinge 11, will be raised. In consequence thereof the foremost part of the mandrel rod 4 is cleared and will be pushed by arm 17, together with the mandrel 6, which has been attached to it before the advancing motion or thereafter, between the pair of rolls 2 close to it, and is by such means brought into operative position, so that when after completion of the rolling operation of the rolls 1, the work piece is pushed back by the ram 9, this work piece will be pushed against the mandrel 6 and between the rolls 2, which have in the meantime been approached to each other. During the rolling operation the mandrel rods are locked by transverse bolts 19 at their rear ends. When the work piece has been rolled over mandrel 5, the corresponding bolt 19 is withdrawn and ram 9 together with rod 3 is retracted. The loose mandrel 5 will drop off its rod at the rear of the work piece, while head 9^a will descend.

Instead of hinging the whole foremost part of the rams, only their end walls or heads 18 may be hinged, as shown in Figs. 4 and 5, and they may be so cut away, as to leave a clear passage for the mandrel rods but not sufficient for the work piece to pass through. On these hinged end walls are provided levers 20, which, on the ram being

advanced, will bear against abutments 21 on the roll housing, so that these ram end walls are raised and allow of the work piece passing between the rolls to enter into the hollow ram. These end walls may also be omitted altogether and in their stead may be used independent heads or slides 22 (Fig. 6) fitted into the race and the hollow of the ram, and placed between the mandrel rods or the mandrels respectively and the work piece. On the mandrels being advanced these slides will advance with them and move the work piece so that it will be seized by the rolls whereupon the slides will fall through openings 23 provided in the front part of the race, and the mandrels will no more be prevented from moving into operative position, in which they are then locked as hereinbefore described.

The work piece may be moved several times back and forward through the same passes and in the races opposite to each other.

I claim:

1. In a tube-rolling mill, two sets of alternately actuated cooperating rolls, a pair of trough-shaped guides arranged on op-

posite sides thereof, mandrel rods received within said guides, a pair of hollow rams inclosing said rods and adapted to engage the work piece, and means for reciprocating said mandrel rods and rams.

2. In a tube-rolling mill, two sets of alternately actuated cooperating rolls, a pair of trough-shaped guides arranged on opposite sides thereof, mandrel rods received within said guides, a pair of hollow rams inclosing said rods and having heads movable relatively to said rams and adapted to engage the work piece, and means for reciprocating said mandrel rods and rams.

3. In a tube-rolling mill, two sets of alternately actuated cooperating rolls, a pair of trough-shaped guides arranged on opposite sides thereof, mandrel rods received within said guides, a pair of hollow rams inclosing said rods and having hinged heads that are adapted to engage the work piece, and means for reciprocating said mandrel rods and rams.

MAX KOCH. [L. S.]

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents Washington, D. C."