(No Model.)

2 Sheets—Sheet 1.

C. G. LARSON.

TUBE ROLLING MILL.

No. 526,157. Patented Sept. 18, 1894.

FIG. 1.

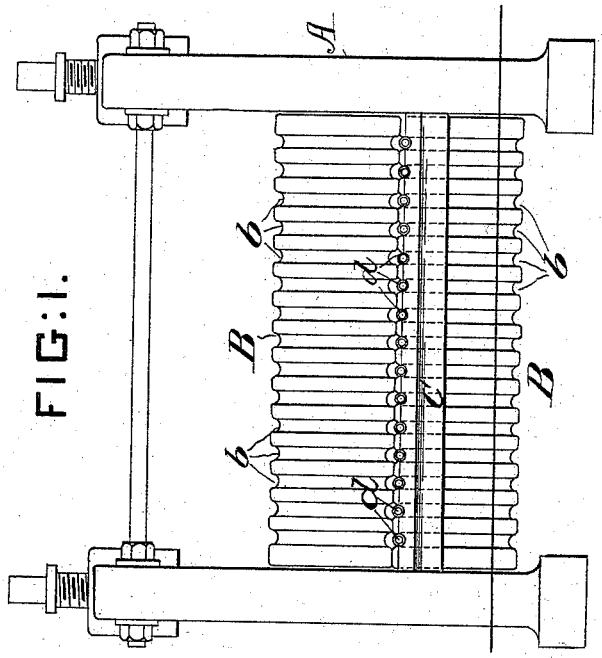
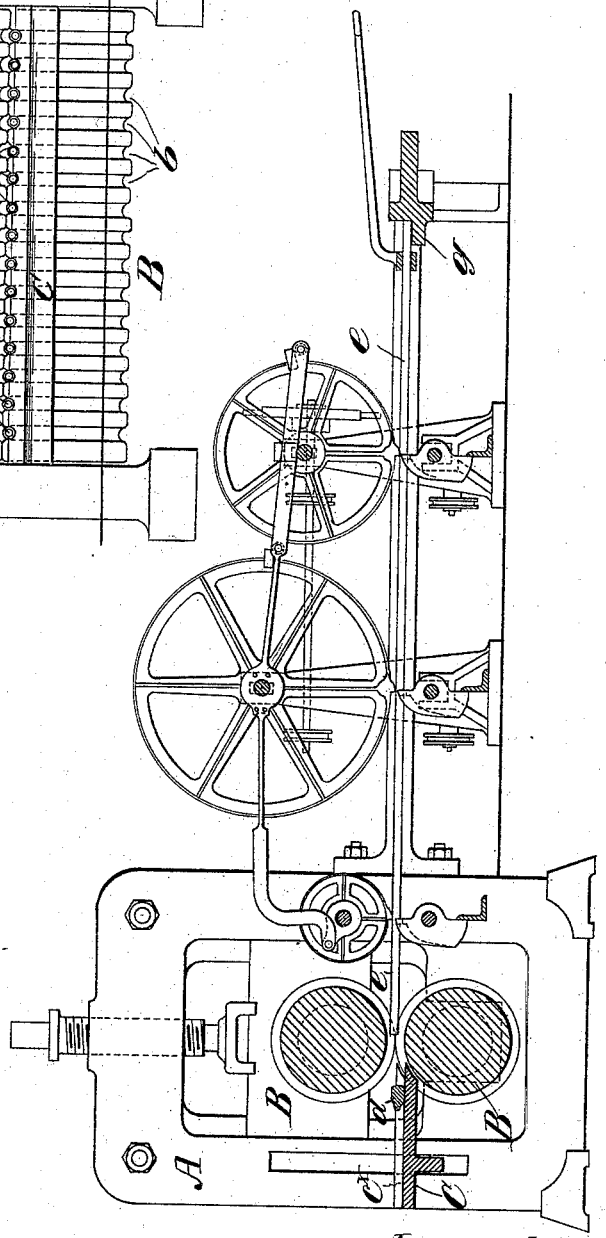


FIG. 2.



Witnesses:
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Inventor:
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his Attorney

(No Model.)

2 Sheets—Sheet 2.

C. G. LARSON.

TUBE ROLLING MILL.

No. 526,157. Patented Sept. 18, 1894.

FIG:5.

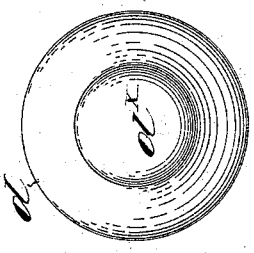


FIG:4.

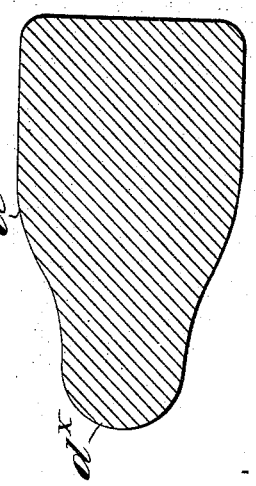
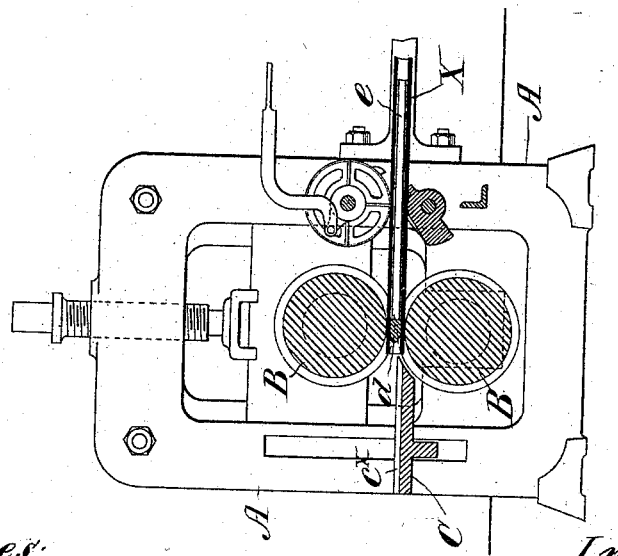


FIG:3.



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UNITED STATES PATENT OFFICE.

CARL GUSTAF LARSON, OF SANDVIKEN, SWEDEN.

TUBE-ROLLING MILL.

SPECIFICATION forming part of Letters Patent No. 526,157, dated September 18, 1894.

Application filed May 16, 1894. Serial No. 511,399. (No model.)

To all whom it may concern:

Be it known that I, CARL GUSTAF LARSON, a subject of the King of Sweden and Norway, residing at Sandviken, in the Kingdom of Sweden, have invented certain new and useful Improvements in Tube-Rolling Mills, of which the following is a specification.

My invention relates to the class of tube rolling mills wherein the tube is drawn by the rolls over a stationary mandrel. It is well known that when a mandrel is employed in this manner it is subjected to great lateral pressure and the mandrel-bar is subjected to great end pressure. If the tube is of small size and consequently the mandrel and its bar quite slender, it often occurs that the mandrel is broken by the lateral pressure where the end-tenon of the mandrel-bar enters it, and the mandrel-bar is bent.

The object of my invention is to obviate these objectionable features and to enable tubes of small diameter and considerable length to be rolled without difficulty. This is effected by employing a solid mandrel which is not attached in any manner to the mandrel-bar, a grooved table to support the mandrels and guide them into the grooves of the rolls, and a mandrel-bar held properly aligned with the groove of the rolls. Thus the mandrel, which lies in its groove in the table in front of the rolls, is carried into the rolls by the tube blank and when in the bite or nip of the rolls, is held in position therein by the tube itself, the mandrel-bar acting as an abutment and preventing it from passing on entirely through the rolls.

In the accompanying drawings I have illustrated my invention as applied to a tube rolling mill.

Figure 1 is a front end view of the mill, and Fig. 2 is a longitudinal, vertical section of the same with the parts in their normal positions. Fig. 3 is a view substantially the same as Fig. 2, but showing the mill in operation rolling a tube. Fig. 4 is an axial section and Fig. 5 an end view of the detached mandrel and on a large scale.

The major portion of the tube rolling mill herein illustrated is known and forms no part of my present invention.

A is the main frame and B, the pair of rolls, having a series of grooves, *b*. These are well known. In front of the rolls I set in the frame (preferably with capacity for vertical adjustment) a table, C, having in its upper surface a series of grooves, $c^{\times}$, registering with the grooves *b*, in the rolls. These grooves are to receive the detached, solid mandrels, *d*, one of which is seen in detail in Figs. 4 and 5.

Supported by suitable means in the frame are the mandrel-bars, *e*. Each mandrel-bar is axially aligned with a groove in the pair of rolls; that is, the axis of the mandrel-bar coincides substantially with the center of the circle formed by the two semi-circular grooves in the rolls. At its outer end the mandrel-bar rests on a ledge, *g*, on the frame and at a point near the rolls it will be supported on another rest and one that will yield and permit of the passage of the tube, X, (seen in Fig. 3). In Figs. 2 and 3 I have represented the mandrel-bar supported at several points in its length by rocking supports which are designed to brace the bar and prevent it from buckling, but these are not essential to my present invention and are shown and claimed in another application of mine, Serial No. 511,400; therefore it will only be necessary herein to say that they are gravity supports for the bar *e*, mounted to rock on their pivots and adapted to yield when impinged upon by the advancing end of the tube X, and that they allow the latter to pass freely. It is only necessary to my present invention that the mandrel-bar shall be supported in the position described and shall extend, at its forward end into the groove of the rolls far enough (see Figs. 2 and 3) to stop the mandrel between the rolls. Fig. 3 shows the position the mandrel should occupy.

The operation of the mill will be readily understood. On inserting a tube or tube blank into the groove of the rolls, the reduced end, ($d^{\times}$ in Fig. 4) of the mandrel (lying in the groove of the table) enters the bore of the tube blank and the mandrel is thus borne in between the rolls until its transversely cut butt-end encounters the transversely cut front end of the mandrel-bar, face-to-face. By this time the tube blank will have been nipped by the rolls, which will then carry it through. After the tube has passed through the rolls and off from the mandrel the latter will drop out of the rolls onto the table in

front. This employment of separate mandrels is especially advantageous in rolling tubes of small diameter where the mandrel-bar must have as large a diameter as possible and the fixing of the end of the bar in the mandrel weakens the latter and materially lessens its ability to resist external lateral pressure. When made solid and detached it has the maximum strength.

Another advantage is that where the mandrels are disconnected or free the same mandrel-bars may be employed with mandrels of different sizes within limits.

The axes of the grooved rolls are at right-angles with the axes of the mandrel-bars and parallel with each other.

Having thus described my invention, I claim—

1. In a tube rolling mill, the combination with the rolls, the mandrel-bars, and a support for the latter, of a mandrel with a solid butt, and disconnected from said bars, substantially as set forth.

2. In a tube rolling mill, the combination with the rolls, a mandrel-bar axially aligned with the passage between the rolls and its front end situated back of and adjacent to the bite of the rolls, and a solid mandrel, disconnected from the mandrel-bar, substantially as set forth.

3. In a tube rolling mill, the combination with the grooved rolls, of the table C, having grooves $c^{\times}$, coinciding respectively with the grooves in the rolls, the mandrel-bars, aligned axially with the respective passages formed by the grooves in the rolls, and the disconnected mandrels, substantially as set forth.

4. In a tube rolling mill, a solid mandrel, having its butt cut transversely, as set forth, and a solid mandrel-bar having its front end against which the mandrel abuts also cut transversely as and for the purposes set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CARL GUSTAF LARSON.

Witnesses:
ERNST SVANQVIST,
CARL TH. SUNDHOLM.