

(No Model.)

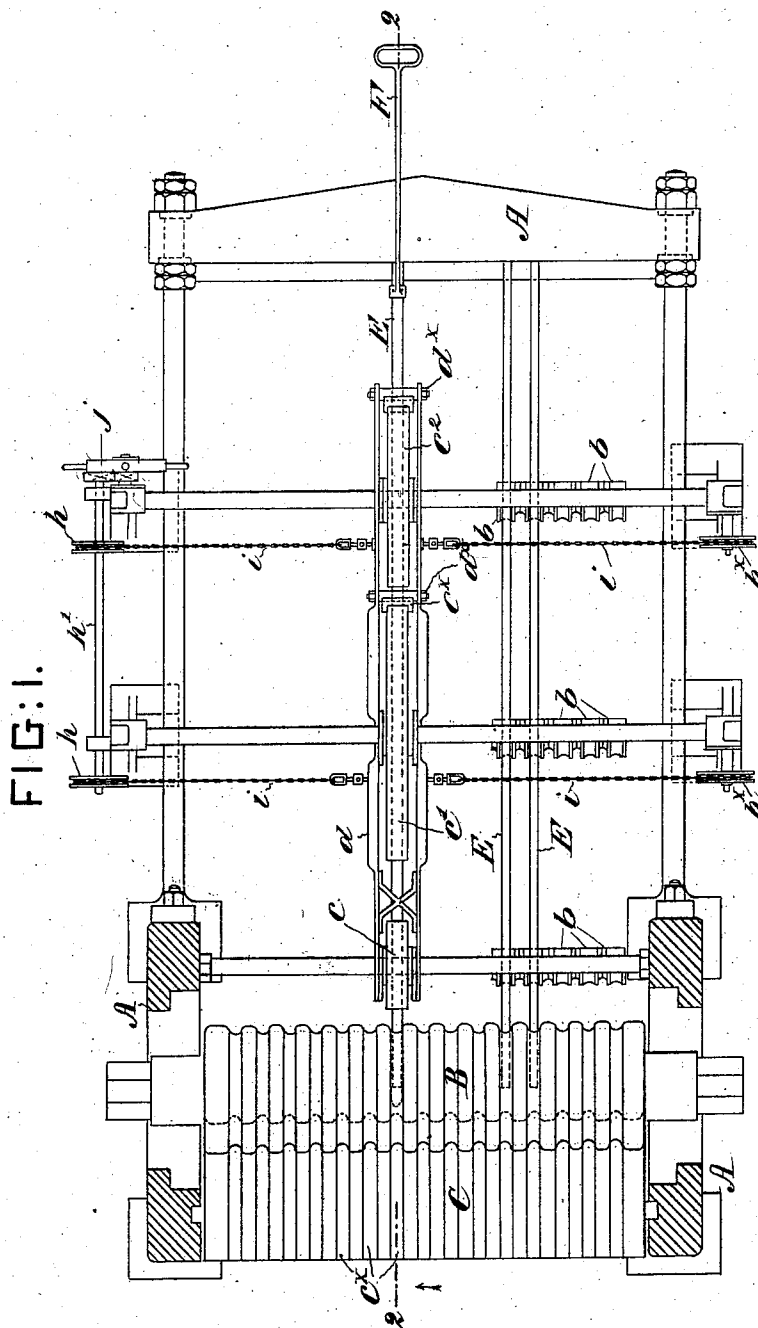
3 Sheets—Sheet 1.

C. G. LARSON.

SUPPORT FOR MANDREL BARS OF TUBE ROLLING MILLS.

No. 528,676.

Patented Nov. 6, 1894.



Witnesses:
J. M. Whiman
Peter A. Ross

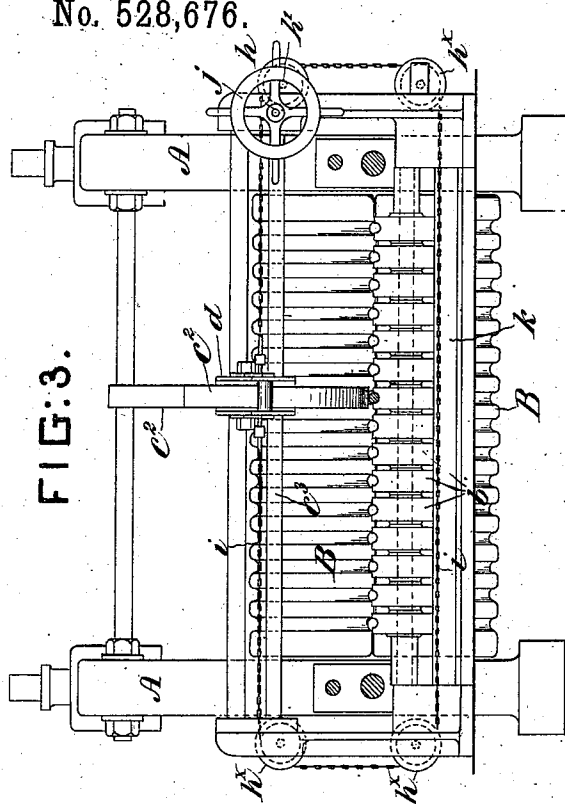
Inventor:
Carl Gustaf Larson
by Henry Conner
his Attorney

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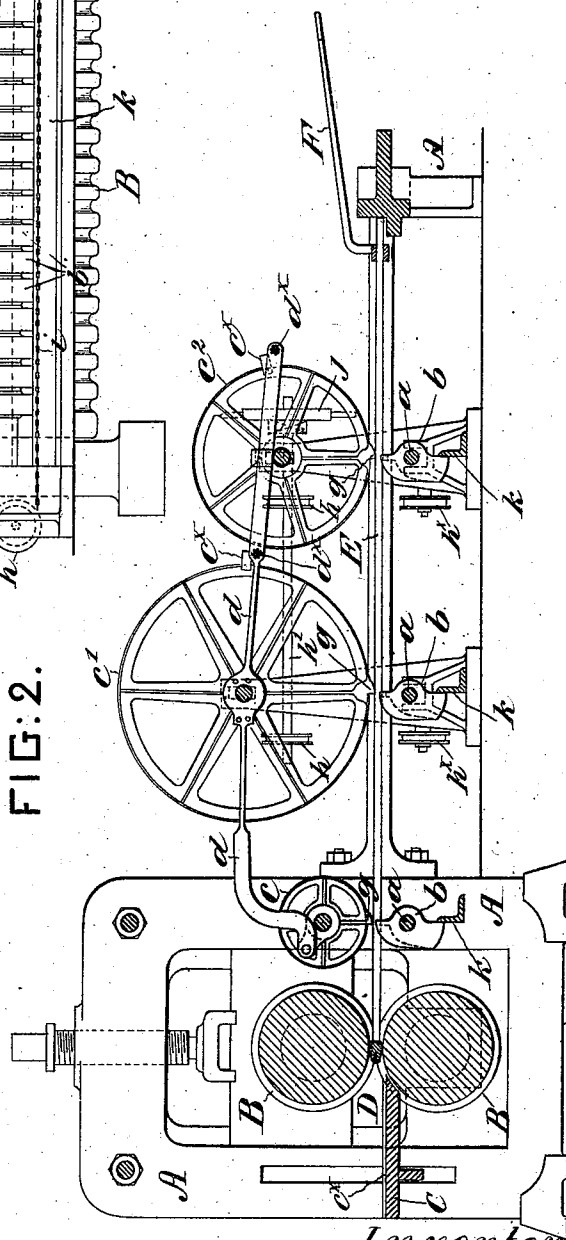
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Inventor:
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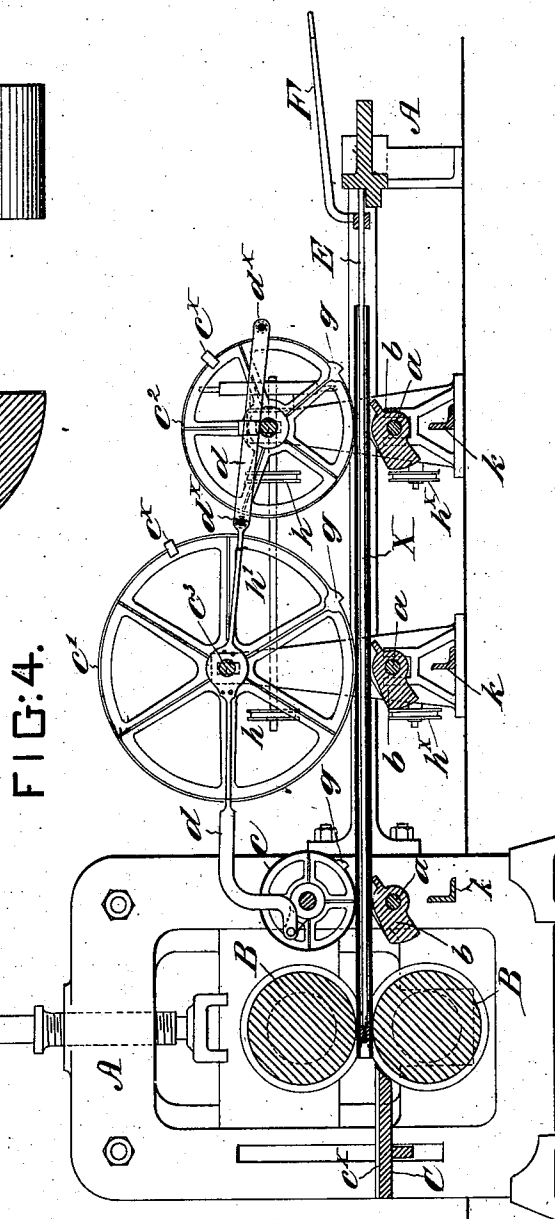
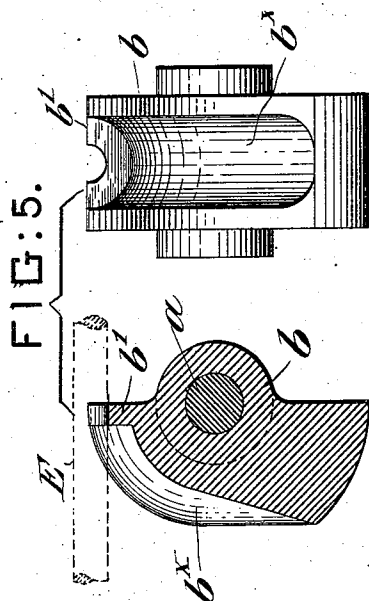
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His Attorney

UNITED STATES PATENT OFFICE.

CARL GUSTAF LARSON, OF SANDVIKEN, SWEDEN.

SUPPORT FOR MANDREL-BARS OF TUBE-ROLLING MILLS.

SPECIFICATION forming part of Letters Patent No. 528,676, dated November 6, 1894.

Application filed May 16, 1894. Serial No. 511,400. (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 Supports for Mandrel-Bars of Tube-Rolling Mills, of which the following is a specification.

My invention relates to means for supporting and bracing the mandrel-bars used in tube rolling mills. Such bars, as is well known, are used to carry the mandrels and keep them in place between the rolls. When the arrangement is such that the mandrel-bar is subjected, in rolling the tube, to an endwise crushing strain, there is a tendency for the bar to bend or buckle, and this is especially the case where the bar is long and slender. To support and brace the mandrel-bar and enable it to resist the strains tending to buckle or bend it, is the object of my present invention, and an embodiment of the means employed therefor is illustrated in the accompanying drawings.

Figure 1 is a plan of a tube rolling mill provided with my improvements. Fig. 2 is a vertical, longitudinal section of the same taken in the plane indicated by line 2, 2, in Fig. 1. Fig. 3 is a rear, end elevation of the same. Fig. 4 is a view identical with Fig. 2 but showing the supports for the mandrel-bars in the position they assume when there is a tube passing them on the mandrel-bar. Fig. 5 shows one of the lower supports in section and in front elevation, detached and on a larger scale.

The tube rolling mill illustrated herein and provided with my improvement, is not in itself new herein, but will be briefly described. In a strong frame A, are mounted the many-grooved rolls, B.

D is a mandrel and E the bar thereof. At its rear end the mandrel-bar is provided with a handle, F, for manipulating it. The bar rests at its rear end upon a ledge on the frame A.

In Fig. 4, X represents a tube on the mandrel-bar F.

I will now describe the means for supporting and bracing the mandrel-bars.

Below the plane of the bars are arranged at suitable intervals three transversely extending shafts or stout cylindrical bars, *a*, which carry the lower supports, *b*, for the mandrel-bars. There will be, on each shaft *a*, a series of these supports *b*, one corresponding to each groove in the rolls. Each support *b* is in the nature of an eccentrically mounted, rocking sector or cam, grooved to receive the mandrel-bar and tube, and over-weighted at one side so as to assume by gravity the position seen in Fig. 2. One of these supports *b* is seen detached in section and front elevation in Fig. 5. In Fig. 1 only a few of the supports *b*, and mandrel-bars are represented. The upper supports are similar to those below in principle of operation, but as there is only one set of them, adapted to be shifted laterally, I have found it more convenient to give them the form of wheels. These upper supports, *c*, *c'*, *c''*, arranged one over each of the shafts *a*, are mounted rotatively on shafts in a frame, *d*, composed in the main of two side plates connected together by ties. Each of the supports *c'* and *c''*, has a flat-faced rim and on this rim a projecting weight, *c^x*, which engages a tie, *d^x*, in the frame *d* (see Fig. 2) and limits the rocking movement of the support. When the detent weight *c^x*, rests on the tie, *d^x*, as in Fig. 2, a projecting toe, *g*, one on the rim of each support *c'* and *c''*, will be directly beneath the center of the rocking support and will impinge on the crown of the mandrel-bar E. The support *c*, is provided also with a toe *g*, but this support is represented as mounted somewhat differently from the others. It has bearings in arms mounted pivotally in the frame *d*. However, the object in representing the three supports *c*, *c'*, *c''*, as different, is mainly to illustrate several modified forms. They might all be substantially alike, and they need only be sectors, not complete wheels.

It will be seen that when the parts are in the normal position seen in Fig. 2, there being no tube on the mandrel-bar, the said bar will be braced and supported from below and laterally by the grooved lower supports *b*, and will be held down from above, by the impingement on it of the toes *g* on the upper sup-

ports. The cheeks at the sides of the grooves in the lower supports rise up to or above the level of the axis of the mandrel-bar, and the toe *g* on the upper supports extend down to and rest on the crown of said bar. Thus the supports sustain and brace the bar against flexure in all directions.

The frame *d*, carrying the set of upper guides *c*, *c'* and *c''*, is adapted to be shifted laterally over the series of mandrel-bars, so that after a tube has been passed over one of said bars the upper guides may be moved laterally over the next adjacent bar, thus leaving the tube on the bar free to be removed. The shaft or bar, *c''*, on which the intermediate support *c'* is rotatively mounted, extends across the machine frame and forms a guide and support for the frame *d* to move on. The shifting mechanism employed for moving the frame *d* and the supports is best illustrated in Figs. 1 and 3. Over sprocket sheaves, *h*, *h'*, are passed two chains, *i*, which embrace the machine frame transversely and are secured to the frame *d*. The sheaves *h* are fixed on a shaft, *h'*, rotatively mounted in the bed and geared with a crank or pilot wheel, *j*. By means of this wheel the frame *d* may be conveniently shifted.

Operation: When the tube *X* is passed through the rolls and over a mandrel and its bar, the advancing end of the tube strikes the parts of the supports which impinge on the mandrel-bar and thus rock said supports in a manner to open a passage for the tube between the upper and lower supports, each pair being thus reached in succession and rocked. When the upper supports are rocked (see Fig. 4) the flat rims thereof will just touch the crown of the tube, and as these rims are not grooved the upper supports may now be shifted laterally to the next adjacent mandrel-bar and the operation of passing a tube repeated. After the tube is removed and out of contact with the upper end and lower supports, these supports return to their normal positions by gravity. There may be stop-bars, *k*, in the frame to limit the movements of the lower supports *b*.

Fig. 5 shows clearly the groove, *b''*, in the lower support *b*, and the collar, *b'*, which normally embraces the lower half of the mandrel bar. The end of the advancing tube *X* strikes this shoulder and rocks the lower support. The tube strikes the toe *g* on the upper support and rocks it.

I have shown the mandrel-bar supported at three points in its length, but the number of points of support will be dependent on its length and diameter. The shifting of the upper supports after each tube is rolled leaves the last rolled tube free to be removed without hinderance from said supports.

I do not wish to limit myself as to the particular form of the several supports for the mandrel-bar as their forms may be varied. The main purpose is to provide supports and

braces for the mandrel-bar at proper points and of such a character that they will yield to, and afford a free passage for the tube.

Having thus described my invention, I claim—

1. In a tube rolling mill, the combination with the rolls, mandrels and mandrel-bars, of rocking supports under said bars, a series of upper rocking supports arranged in line lengthwise of the mill, a frame in which these upper supports are mounted and means for shifting said frame and supports laterally, whereby they may be brought in succession over the mandrel-bars, substantially as set forth.

2. In a tube rolling mill, the combination with the rolls, mandrels and mandrel-bars, of the grooved, rocking supports arranged beneath the mandrel-bars and adapted to embrace said bars beneath and at the sides, and laterally movable rocking supports arranged over the said bars and adapted to bear on the same normally, said upper and lower supports having weights to keep them in operative position and projections in the path of the tube whereby the latter displaces the supports as it passes over the mandrel-bar.

3. In a tube rolling mill, the combination with the rolls, mandrels and mandrel-bars and lower, rocking supports therefor, of the upper rocking supports mounted in a frame, and the means for shifting said frame laterally, said means comprising two endless chains embracing the machine and coupled to the support carrying frame, sheaves on which said chains are mounted, a shaft on which the driving sheaves are secured, and a crank for rotating said shaft.

4. In a tube rolling mill, the combination with the rolls, mandrels and mandrel-bars, of the rocking upper supports having projections *c''*, to limit their rotation plain faces adapted to bear on the tubes, and projecting toes *g*, to bear on the crown of the mandrel-bar, said toes being in the path of the tube passing over the mandrel-bar, and rocking lower supports for said bars.

5. In a tube rolling mill, the combination with the rolls, mandrels and mandrel-bars, of upper rocking supports for the bars, and rocking gravity lower supports *b*, each having a grooved portion to receive and support the tube and a collar *b'*, arranged in the path of a tube passing over the mandrel-bar and having a groove to receive and support the said mandrel-bar, as set forth.

6. The combination with the grooved rolls, mandrels and mandrel-bars, of rocking supports arranged under said bars, and laterally movable rocking supports arranged over said bars, substantially as set forth.

7. The combination with the rolls, of a mandrel and a mandrel-bar, and a rocking support for said mandrel-bar, said support having a projecting grooved collar adapted to receive and support the mandrel-bar and ar-

5 ranged in the path of and adapted to be engaged by the tube passing over the mandrel-bar, whereby the support is rocked, said support being also provided with a portion having a groove of larger diameter adapted to take under and support the tube when the support is rocked, substantially as set forth.

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

CARL GUSTAF LARSON.

Witnesses:

ERNST SVANGEST,

CARL TH. LUNDHOLM.