No. 658,882. Patented Oct. 2, 1900.

G. J. THUST.

MANDREL MECHANISM FOR ROLLING BILLETS INTO TUBES.

(Application filed July 18, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

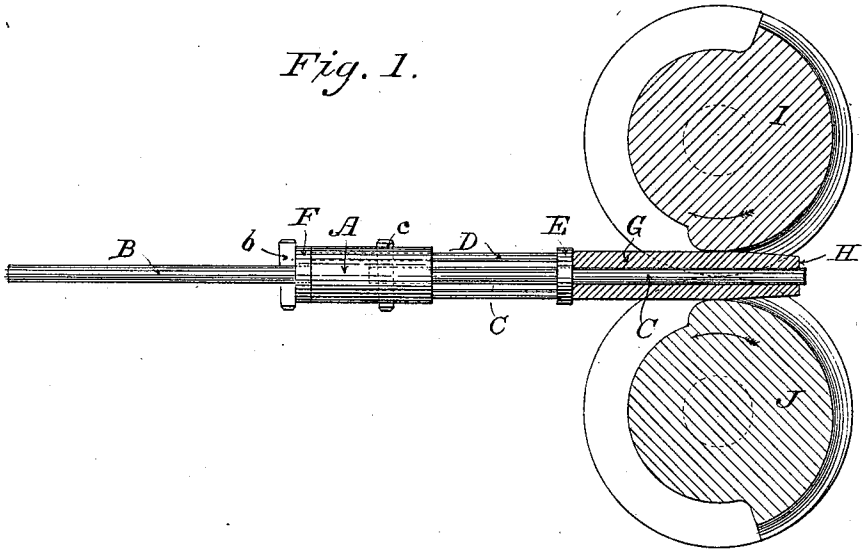


Fig. 2.

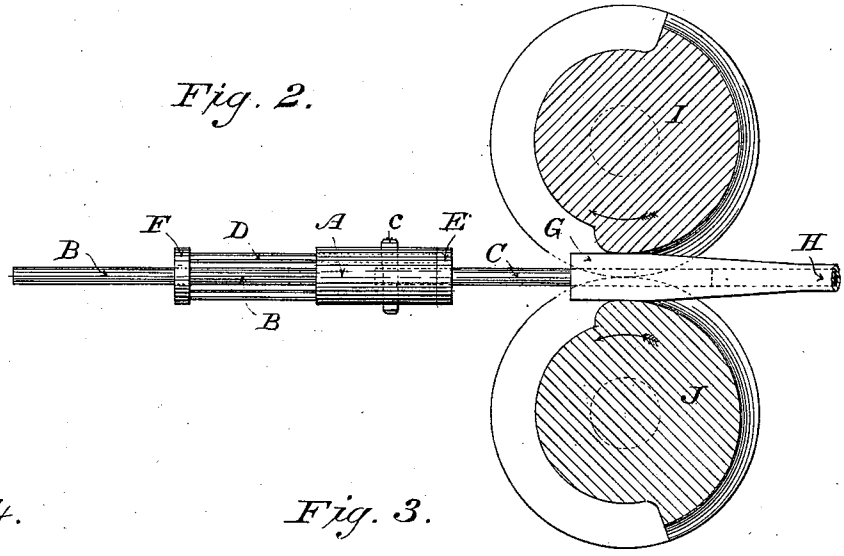


Fig. 4.

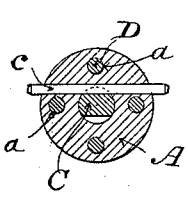
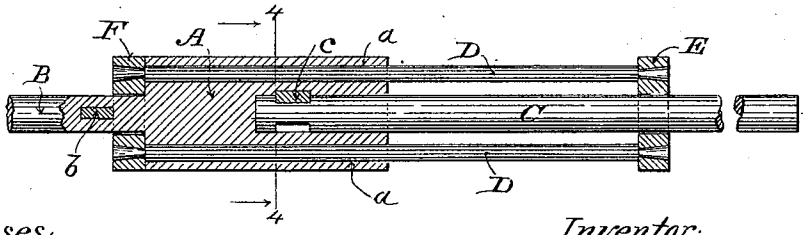


Fig. 3.



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Fig. 5.

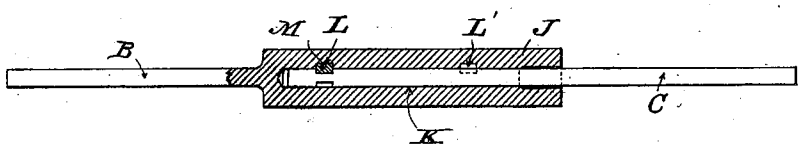


Fig. 6.

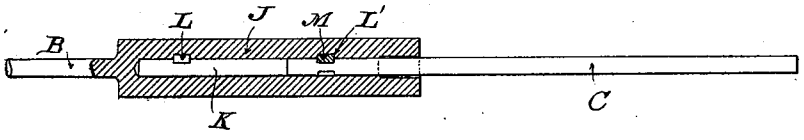


Fig. 7.

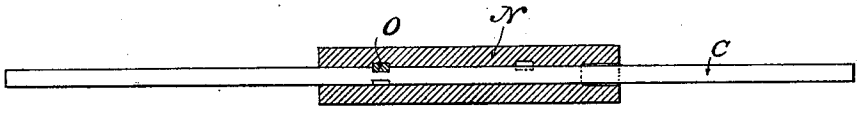
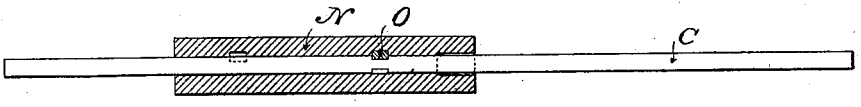


Fig. 8.



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UNITED STATES PATENT OFFICE.

GEORGE J. THUST, OF TOLEDO, OHIO, ASSIGNOR TO THE SHELBY STEEL TUBE COMPANY, OF PITTSBURG, PENNSYLVANIA.

MANDREL MECHANISM FOR ROLLING BILLETS INTO TUBES.

SPECIFICATION forming part of Letters Patent No. 658,882, dated October 2, 1900.

Application filed July 18, 1900. Serial No. 24,020. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. THUST, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Mandrel Mechanism for Rolling Billets into Tubes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

My invention relates to improvements in mandrel mechanism for rolling tubes, and comprises improvements hereinafter described, whereby the entire billet can be rolled out into a tube. The mandrel now commonly used for rolling billets into tubes consists usually of a straight round rod from eight to ten feet long, upon which a billet from twelve to eighteen inches long having a central hole therein is placed. The operator then utilizing one end of the mandrel as a handle repeatedly inserts the other end of the mandrel with the billet thereon between the rolls until the billet is drawn out into a tube. Meanwhile the billet has expanded both ways upon the mandrel until finally the end thereof next the operator gets so close to the operator's hands that a portion of the rear end of the billet cannot be rolled, and this portion of the billet is therefore cut off and becomes waste. To overcome this difficulty, I use a short mandrel from three to four feet long, which is detachably secured in a suitable head provided with an operating-handle and also provided with an adjustable and removable shoulder or collar, against which the rear end of the billet abuts, so as to prevent the billet expanding back upon the mandrel until the billet is nearly rolled, the expansion of the billet as it is being rolled into the tube meanwhile pressing the finished portion of the tube off over the outer end of the mandrel. When, however, the billet is nearly all rolled, the adjustable shoulder or collar is moved back from the rear end of the billet, and the balance of the billet is then rolled, utilizing the entire length thereof, and while this is being done the rear portion thereof expands backward upon the mandrel toward the shoulder or collar on the mandrel, and when the entire billet is rolled out into a finished tube the mandrel is detached from the shoulder or collar and then withdrawn from the finished tube. A convenient mechanism which I have devised to accomplish this result is hereinafter described, and illustrated in the accompanying drawings, in which—

Figure 1 shows my improved mandrel mechanism with a billet thereon, a small portion of which is rolled into a tube. Fig. 2 shows the mandrel mechanism with the billet thereon nearly all rolled out into a tube and with the collar moved back from the rear end of the billet, so that the remainder thereof can be rolled. Fig. 3 shows an enlarged longitudinal section of my improved mandrel mechanism. Fig. 4 shows a transverse section of the same on the line 4 4 in Fig. 3. Figs. 5 and 6 show one modification of my invention, and Figs. 7 and 8 another.

In the construction of my invention thus illustrated, A is the head, and B an operating-handle secured in the rear end thereof. In the front end of the head A there is a mandrel C, secured in a socket therein by means of a transverse removable key *c*. Through the head A are longitudinal holes *a*, through which rods D slide freely. On the front and rear ends of these rods D are secured collars E and F, the collar E sliding freely over the mandrel C and the collar F sliding freely over the handle B. Through the handle B there is a removable key *b*, adapted to retain the collar F against the rear end of the head A, as illustrated in Figs. 1 and 3, while the greater portion of the billet G is being rolled into a tube H, but which key *b* is adapted to be removed when the billet is nearly finished, so as to allow the collar E to be moved back from the rear end of the billet G, so as to allow the rear end of the billet to be rolled, so as to make the entire length of the billet into the tube H, which when done the key *c* is removed and the mandrel C detached from the head A, after which the mandrel is removed from the finished tube H.

In operation the collar F is moved up against the rear end of the head A and the

key *b* inserted. A billet G is then placed upon the mandrel C, the rear end of which contacts with the collar E. The operator then inserts the mandrel and front end of the billet thereon between the rolls I and J at the proper time during their revolution. This operation is repeated at each revolution of the rolls until the billet G is all rolled into the tube H, except a small portion of the rear end thereof, as illustrated in Fig. 2, which operation has expanded nearly all of the billet G longitudinally outwardly over and beyond the end of the mandrel C as the tube H. The key *b* is then removed and the collar E moved back against the front end of the head A, and the process of rolling the rear end of the billet into the tube H is completed, the rear end of the billet during this latter part of the process of rolling expanding rearwardly upon the mandrel C until the process is completed. The key *c* is then removed and the mandrel C withdrawn from the head A and collar E, after which it is withdrawn from the finished tube H.

I have thus described a convenient mechanism embodying my invention; but I do not confine myself to the exact construction herein shown and described, as I am aware that many modifications can be made in the construction thereof by those skilled in the art to which it appertains. Some of these modifications which now occur to me are shown in Figs. 5 to 8, inclusive, of the drawings. In these modifications I dispense with sliding collars E and F and their connecting-rods D and use the forward end of the head J as the shoulder or stop for the rear end of the billet, the head being adjustable along the mandrel and secured at the prescribed points to effect the same purpose as the sliding collar of the first four figures.

In Figs. 5 and 6 the head J is provided with a fixed handle B and has a deep socket K, with two cross-keyways L and L′ sufficiently far apart to permit of the retraction of the head or shoulder on the mandrel the required distance.

At the beginning of operation the head is in its most advanced position on the mandrel, the locking-key M engaging the rear aperture L, as shown in Fig. 5, while at the finish of the operation the head is retracted on the mandrel, as shown in Fig. 6, and the key engages the aperture L′. The same result may be produced with the construction shown in Figs. 7 and 8, in which the mandrel and handle are composed of a single continuous rod, upon which the head or stop N may be adjusted longitudinally to the desired positions and locked in place by a cross-key O, as will be readily understood by an inspection of the drawings.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination in an apparatus for rolling billets, into tubes, of a mandrel, a longitudinally-movable collar thereon, and means for securing said collar when moved forward on said mandrel, substantially as and for the purpose set forth.

2. The combination in an apparatus for rolling billets into tubes, of a head having an operating-handle thereon, a mandrel removably secured in said head, a collar adapted to be projected outwardly from said head over said mandrel, and means for securing said collar when so moved forward, substantially as and for the purpose set forth.

3. The combination in an apparatus for rolling billets into tubes, of an operating-handle, a head secured thereon, a mandrel removably secured in the front end of said head, a collar adapted to slide on said mandrel in front of said head, a collar adapted to slide on the handle at the rear of said head, rods connecting said collars together, and means for securing the collar on the operating-handle up against the rear end of the head, substantially as and for the purpose set forth.

4. In an apparatus substantially as described for rolling seamless metal tubes, the combination of a mandrel with a movable stop or shoulder and means for securing it to the mandrel at prescribed distances from the point thereof for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE J. THUST.

Witnesses:
E. W. GAGE,
WM. C. MILLER.