Nov. 18, 1924.

1,516,007

J. A. FRAUENHEIM

METHOD OF MAKING STAY BOLTS

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Fig.1.

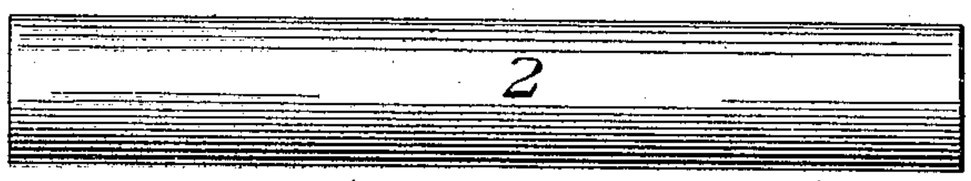


Fig.2.

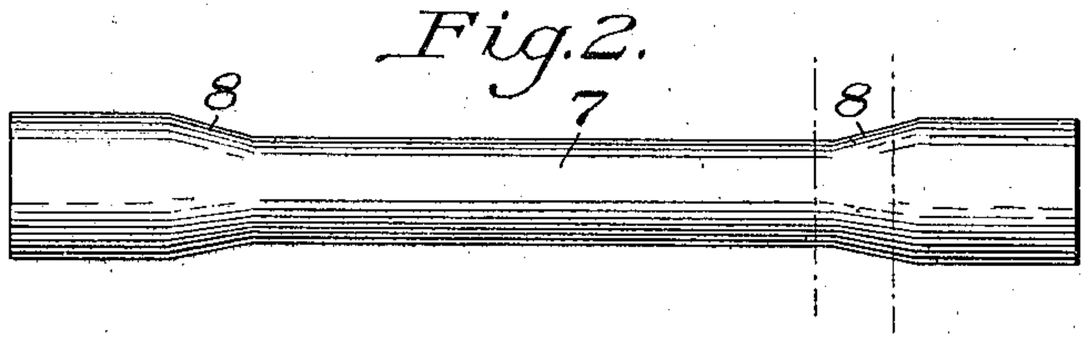


Fig.5.

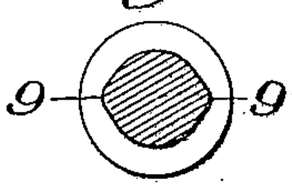


Fig.4.

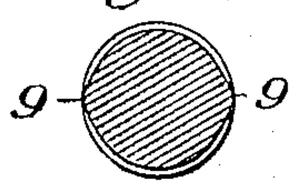


Fig.3.

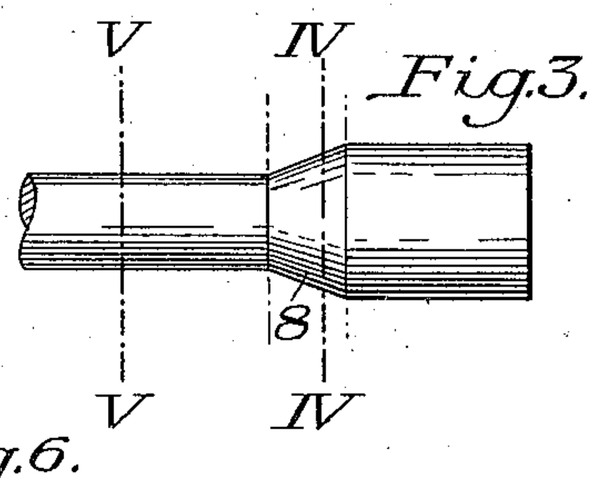


Fig.6.

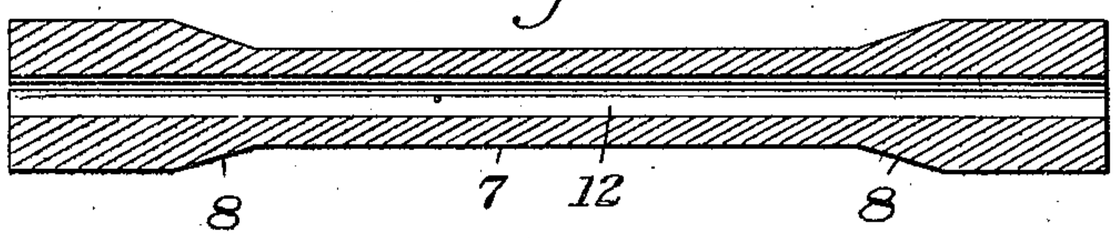
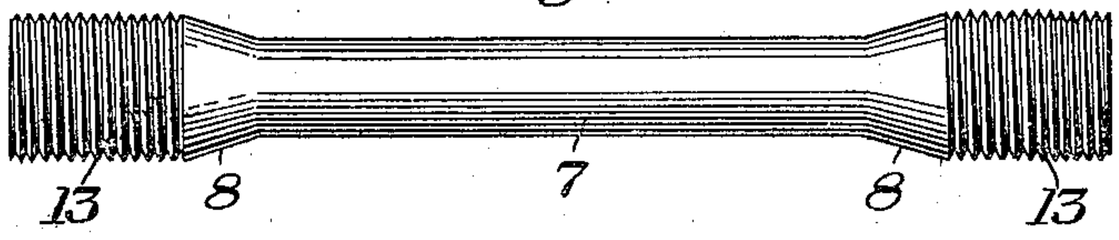


Fig.7.



Inventor
Joseph A. Frauenheim
by Bakewell, Stetfinius, Burgess & Parmelee
his Attorneys

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Fig. 8.

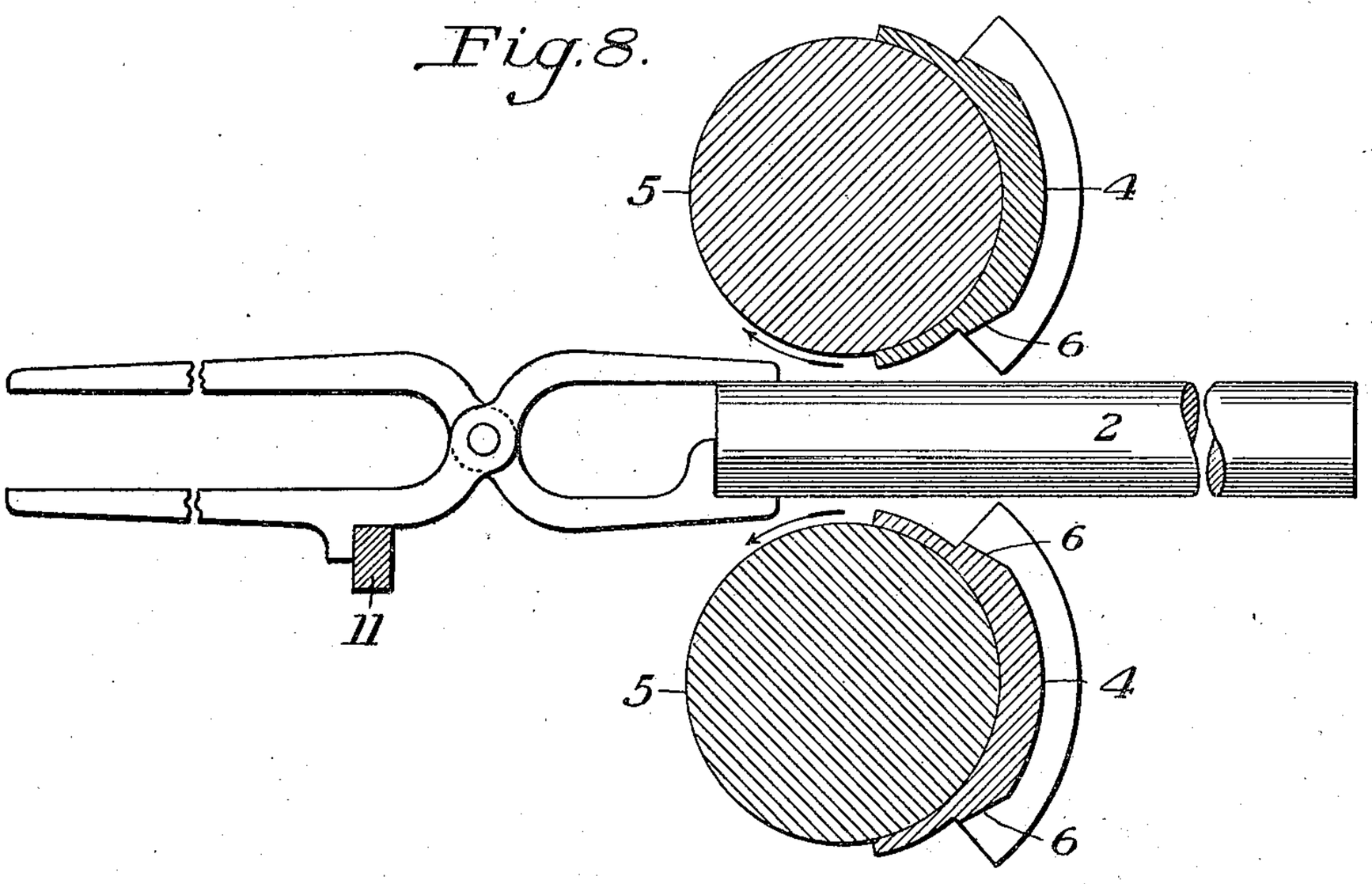
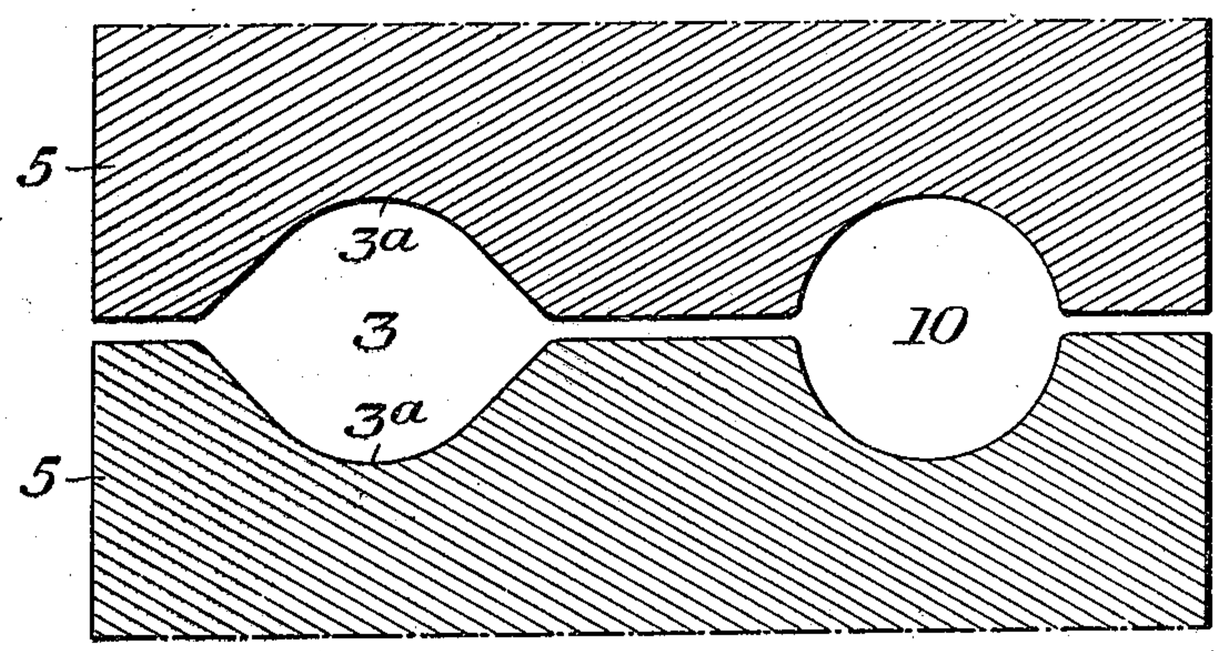


Fig. 9.



INVENTOR
Joseph A. Frauenheim
by Baynes Stebbins Burgess & Rumbaa
his Attorneys

Patented Nov. 18, 1924. 1,516,007

UNITED STATES PATENT OFFICE.

JOSEPH A. FRAUENHEIM, OF ZELIENOPLE, PENNSYLVANIA, ASSIGNOR TO AMERICAN FLEXIBLE BOLT COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

METHOD OF MAKING STAY BOLTS.

Continuation of application Serial No. 237,405, filed May 31, 1918. This application filed October 28, 1921. Serial No. 511,217.

To all whom it may concern:

Be it known that I, JOSEPH A. FRAUENHEIM, residing at Zelienople, in the county of Butler and State of Pennsylvania, have invented a new and useful Improvement in Methods of Making Stay Bolts, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view showing the initial form of blank used in the manufacture of my improved stay bolts;

Figure 2 is a plan view of the same after it has been subjected to the action of the first roll pass;

Figure 3 is a similar view of one end portion of the blank through an angle of 90° from the position shown in Figure 2;

Figures 4 and 5 are sections taken, respectively, on the lines IV—IV and V—V of Figure 3;

Figure 6 is a longitudinal sectional view of the blank after it has been roll-finished and drilled;

Figure 7 is a plan view of the completed bolt;

Figure 8 is a transverse vertical section through the rolls employed; and

Figure 9 is a longitudinal vertical section showing the form of the two roll passes.

My invention has relation to stay bolts and the manufacture thereof, and is designed to provide a stay bolt comprising a body portion and integral heads, the body portion being of reduced diameter and united to the head by tapered portions of a frusto-conical form, said body and tapered portions being roll-shaped and finished.

My invention is also designed to provide a simple and practicable method by which bolts of this character can be readily shaped from an initial blank by rolling operations. My invention may be applied to the manufacture of solid or hollow stay bolts.

Referring to the accompanying drawings, the numeral 2 in Figure 1 designates the initial form of the blank which I employ. This blank is approximately cylindrical and is of a length somewhat shorter than the length of the finished bolt, inasmuch as the shaping operations hereinafter described effect an elongation of the blank.

In accordance with my invention, I take a blank such as shown in this figure, and subject it to the action of a roll pass 3, having substantially the form shown in Figure 9; that is to say, somewhat elliptical, although having the portions 3^a, which are adapted to give an approximately cylindrical shape to the surface of the blank, with which they contact. This pass is formed between segmental projections 4 on a pair of rolls 5, the length of the contacting surfaces of the pass walls being sufficient to act upon the intermediate portion only of the blank. These rolls rotate in the direction of the arrows shown in Figure 8. The pass entrances and exits are beveled, as indicated at 6, so as to give the desired shape to the tapered or frusto-conical portions of the blank. After the blank has been subjected to the action of this pass, it has the form substantially as shown in Figures 2, 3, 4 and 5. As shown in these figures, its central body-forming portion 7 has been elongated and reduced in diameter, this reduced portion being slightly elliptical in cross section, although partially finished to cylindrical form by the action of the portions 3^a of the pass-forming walls. At the same time, the tapered or frusto-conical portions 8 have been partially shaped, a section through either one of these portions being generally such as that indicated in Figure 4. It will be noted that in this figure, there are distinct ridges or fins 9 left at diametrically opposite sides of the blank. The blank is now rotated through an angle of 90°, and is then subjected to the action of a second roll pass of the cylindrical form shown at 10 in Figure 9. By the action of this pass, the central body-forming portion of the blank is completely finished to cylindrical form, and the tapered portions 8 are also given their final frusto-conical form.

The ridges or fins of metal are particularly important in securing the proper action of this second pass upon the blank. Without the provision of such ridges or fins, the rolls

would not take hold of the partially formed frusto-conical portion of the blank at exactly the proper point, and the consequence would be that the tapered or frusto-conical portions would not be symmetrically finished entirely around the bolts. By the provision of these ridges of metal, the rolls take a bite thereon at exactly the proper point, and a symmetrical finish can be made. To insure the action of the rolls in both passes upon exactly the right portions of the blank, the blank is inserted a fixed distance between the rolls by means of a pair of tongs or pincers which are shoved against a suitable stop 11. The blanks are introduced between the rolls in a direction opposite to the direction of rotation of said rolls, and are returned to the operator as the portions 4 engage and grip the blanks. This operation enables the operator to maintain his grasp on the blanks until the bolts are completed, and avoids the necessity for two operators and a rehandling of the articles. It also makes it possible to complete a bolt with one heating thereof, and thereby affords a substantial saving of time, labor and cost of heating fuel. The blanks are always inserted a fixed distance between the rolls which results in bolts of uniform size and shape.

After the blank has been roll-finished in the manner just described, it may be bored or drilled longitudinally, as shown at 12 in Figure 6, provided a hollow bolt is desired. In any event, its end or head-forming portions are threaded, as shown at 13 in Figure 7.

Inasmuch as the entire external shaping portions are carried out in accordance with my invention by means of rolls, the bolts may be readily manufactured.

This application is a continuation of my application Serial No. 237,405, filed May 31, 1918.

I claim:

1. The method of making reduced body stay bolts, which consists in presenting a blank a fixed distance between rotatable rolls and in a direction opposite to the direction of rotation of said rolls, allowing said rolls to partially form said blank and produce fins thereon while returning it to the place of starting, and turning and again presenting said blank to another rolling pass to complete the formation of said bolt, substantially as described.

2. The method of rolling reduced body stay bolts, which consists in introducing blanks of suitable length and size a fixed distance between rotatable rolls and in a direction opposite to the direction of rotation of said rolls, allowing said rolls to take hold of said blanks and return same and to cause a flow of the metal thereof in the body portion of the bolt to produce fins thereon, turning said blanks, and repeating said operation to reduce the body portion and give the desired shape to said body portion, substantially as described.

3. The method of rolling reduced body stay bolts, which consists in introducing blanks of suitable length and size approximately that of the heads of the finished article a fixed distance between rotatable rolls and in a direction opposite to the direction of rotation of said rolls, allowing said rolls to take hold of said blanks and return the same and to cause a flow of the metal thereof in the body portion of the bolt to produce fins on opposite sides of the bolt, turning said blanks, and repeating the said operation to effect removal of said fins and reduce the body portion and give the desired shape to said body portion, substantially as described.

4. In a machine for rolling reduced body stay bolts, the combination of a pair of cooperating rolls having cooperating grooves therein to produce the configuration of a bolt, one of said grooves forming an elliptical pass and the other of said grooves a circular pass, and means whereby the introduction of the blank between the rolls may be limited to a predetermined distance, said rolls being effective to form and return the introduced blank by engagement of the blank between said cooperating grooves, said elliptical pass forming definite fins on the blank adapted to properly start the blank in the circular pass, substantially as described.

In testimony whereof I have hereunto set my hand.

JOSEPH A. FRAUENHEIM.