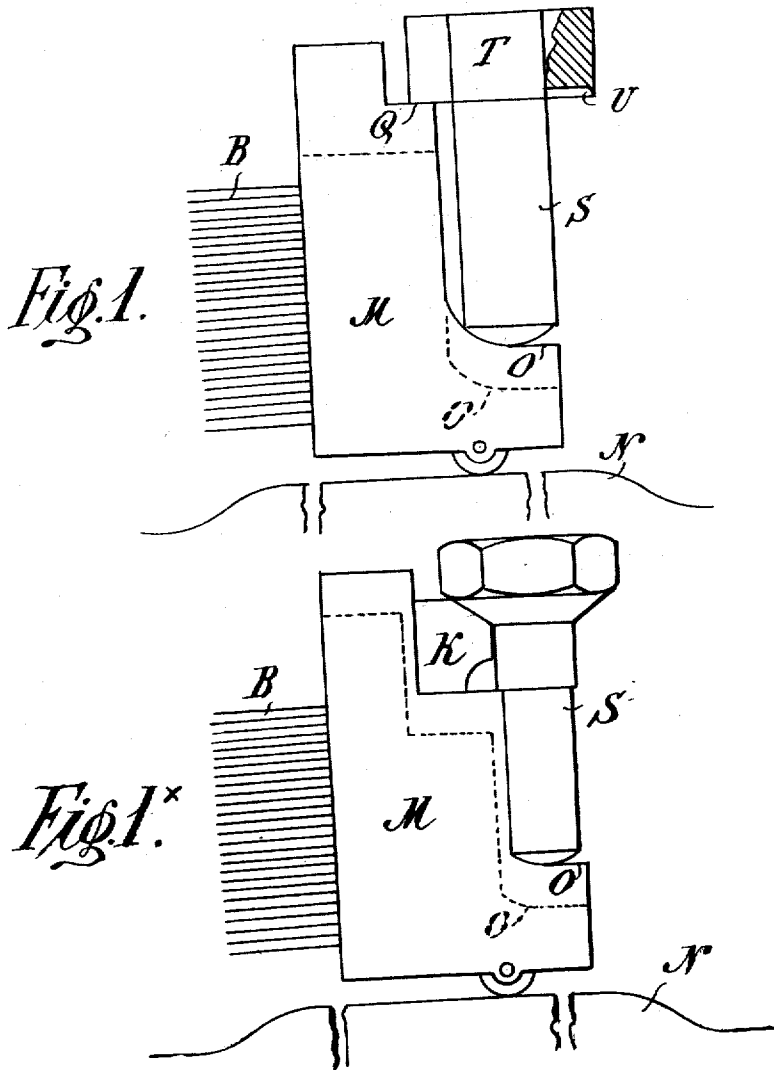


J. HELLER.
 PROCESS FOR ROLLING SCREW BOLTS.
 APPLICATION FILED JUNE 9, 1910.

Patented Feb. 13, 1912.
 2 SHEETS—SHEET 1.

1,017,543.



Witness:
J. H. Miller
att. male Jr.

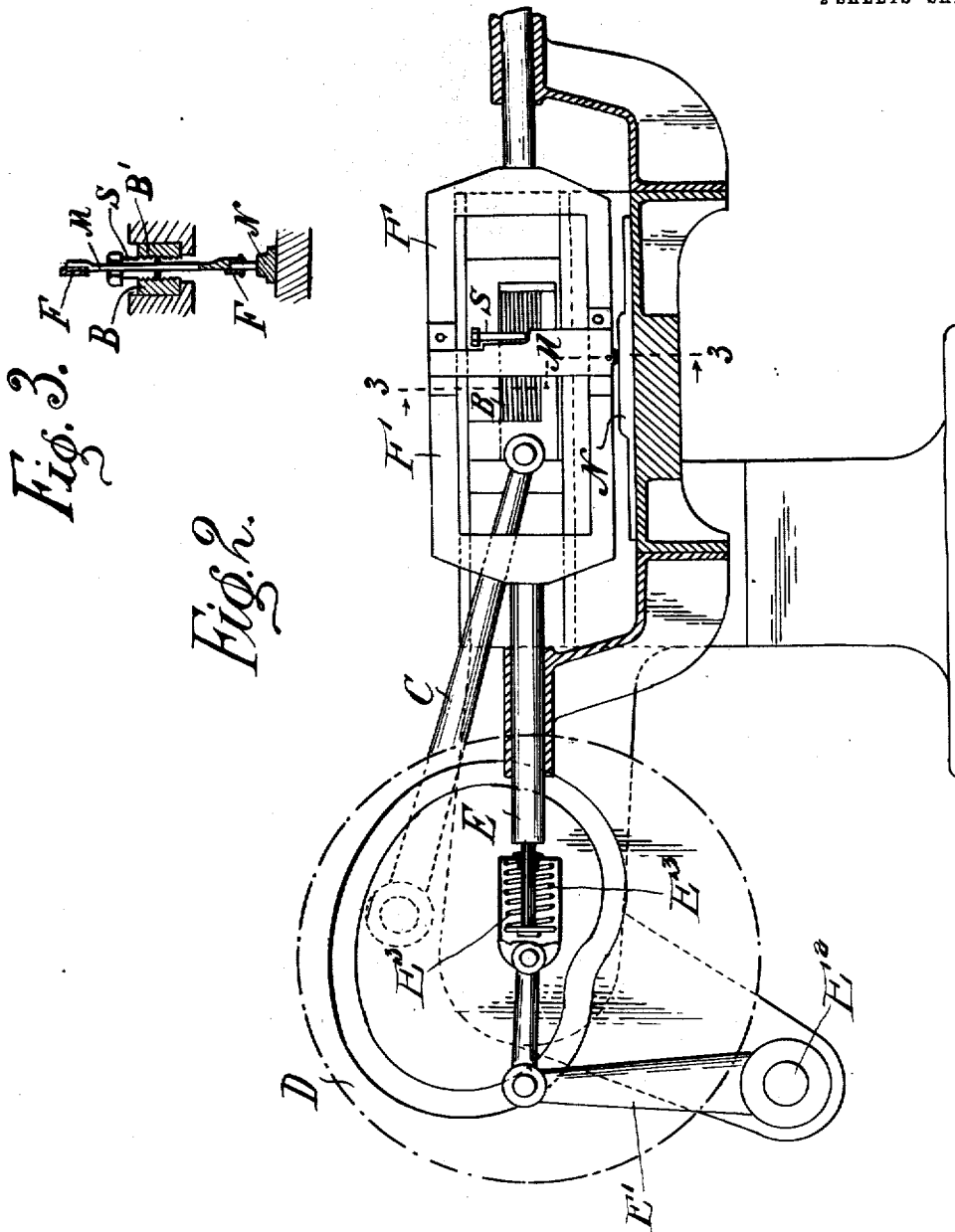
Inventor
Julius Heller
 by *William J. Fisher* & *W. H. Thompson*
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Witnesses.
J. S. Givens
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Inventor.
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UNITED STATES PATENT OFFICE.

JULIUS HELLER, OF VIENNA, AUSTRIA-HUNGARY, ASSIGNOR TO THE FIRM OF
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PROCESS FOR ROLLING SCREW-BOLTS.

1,017,543.

Specification of Letters Patent.

Patented Feb. 13, 1912.

Application filed June 9, 1910. Serial No. 566,048.

To all whom it may concern:

Be it known that I, JULIUS HELLER, a subject of the Emperor of Austria-Hungary, residing at Vienna, Empire of Austria-Hungary, have invented certain new and useful Improvements in Processes for Rolling Screw-Bolts; 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.

My invention relates to an improved process for rolling screw bolts.

The object of my invention is to provide an improved process of turning down the point or end of the bolt while the thread is being rolled into the same. This process consists in moving the knife serving for turning down the end or point of the bolt during rolling in the thread relatively to the thread in the direction of the axis of the bolt. This is preferably brought about in the machine serving for carrying into practice the said process by moving the knife in the direction of the axis of the bolt by means of a guide on a part of the machine moving at right angles to the axis of the bolt while the thread is being rolled.

Simultaneously with the turning down of the end or point of the bolt the bottom side of the bolt head may be turned down. For this purpose on the knife serving for turning down the end or point of the bolt an edge is provided which acts on the bottom side of the bolt head. Further simultaneously with the turning down of the bolt end also the outer surface of the threads while being formed may be turned down in order to impart to the thread directly by the rolling a predetermined outer diameter. For this purpose the knife besides being moved in the direction of the axis of the bolt during rolling action is also moved at right angles to the said axis.

In the annexed drawings Figures 1 and 1^x illustrate diagrammatically the carrying into practice of my improved process. Fig. 2 shows in side elevation a machine adapted to carry into practice the said process. Fig. 3 illustrates a sectional view taken on line 3—3 of Fig. 2.

The thread is rolled into the bolt S in the well known manner by dies moving relatively and parallel to each other and at

right angles to the axis of the bolt so that the bolt rolls on both dies. Obviously one of the dies may be stationary and the other may move or both dies may move in opposite directions.

The knife M for turning down the end or point of the bolt while the thread is being rolled is moved according to my invention in the direction of the axis of the bolt. At the beginning of the rolling operation the knife M is in the position indicated by dotted lines in Fig. 1 in which position the edge O serving for turning down the end of the bolt is out of contact with the same. In the course of the rolling operation the knife M is moved toward the bolt in the direction of the axis of the latter whereby the edge O comes into engagement with the end of the bolt and turns it down to the desired extent as indicated in Fig. 1 in full lines. At the end of the rolling operation the knife is moved back away from the bolt into the position indicated in dotted lines in Fig. 1 for releasing the bolt so that it may be removed after rolling. Besides the movement in the direction of the axis of the bolt above described a movement at right angles to such axis may be imparted to the knife, as illustrated by Fig. 1^x and the knife may be provided with a cutting edge M' parallel to the axis of the bolt. At the beginning of the rolling operation the knife M is out of contact with the bolt S as indicated in dotted lines in Fig. 1^x.

In the course of the rolling operation the knife M is moved toward the bolt not only in the direction of its axis for turning down the end or points of the bolt as above described, but also in a direction at right angles to the axis of the bolt so that it reaches the position indicated by full lines in Fig. 1^x. In this way the cutting edge M' parallel to the axis of the bolt turns down the outer surface of the thread being formed.

The movement of the knife in a direction at right angles to the axis of the bolt is so governed that a predetermined outer diameter is imparted to the thread of the bolt directly by the rolling as disclosed in my prior Patent No. 967,768 of August 16, 1910. By rolling in the thread part of the metal of the bolt is forced outward so that the outer diameter of the thread obtained by

rolling would be greater than that of the shank of the bolt. If now the outer surface of the thread is turned down during rolling as set forth, the amount by which the outer diameter of the thread exceeds that of the shank may be reduced to any desired extent and even to zero or the outer diameter of the rolled in thread may be made smaller than that of the shank.

According to the desired outer diameter of the thread the cutting edge M' of the knife M is more or less approached to the axis of the bolt in the course of the rolling operation but the knife must recede from the bolt before completing the rolling in order that the thread may receive exactly the contour of the dies. Simultaneously with the turning down of the point or end of the bolt also the underside of the bolt head may be turned down by providing on the knife M a cutting edge acting on the said underside. This cutting edge is shaped to correspond with the desired contour of the underside of the bolt head. As shown in Fig. 1 this cutting edge Q is straight and at right angles to the axis of the bolt so that it turns down plane the underside of the bolt head T. In so doing it removes the bur U which is formed in pressing the head through a die hole. In Fig. 1* this second cutting edge K is so shaped that it turns down conically the underside of the bolt head. The edge Q or K must be in such a position relatively to the cutting edge O turning down the point of the bolt that the bolt head is finished at the same time as the bolt end. In order to insure this with certainty in all cases the cutting edge Q or K for the underside of the bolt head may be adjustable on the knife.

The movement of the knife in the direction of the axis of the bolt is imparted to the knife M by a guide N, Figs. 1 and 1* on a part of the machine which during rolling moves relatively to the bolt and at right angles to its axis. This part is preferably the frame of the machine if one of the dies is fast in such frame and the other is movable. If the dies move in the frame in opposite directions and with the same speed so that the bolt does not move at right angles to its axis relatively to the frame during rolling, the guide N will have to be arranged on one of the dies.

The construction of a machine adapted for carrying into practice the above described process does not form part of this application. In Fig. 2 I have shown such a machine for clearly illustrating my process, and in this figure only one of the dies as indicated at B is moved while the other die B' is stationary and the bolt moves during rolling with half of the speed of the movable die at right angles to its axis. In this case the knife M must move in the frame at

right angles to the axis of the bolt. This is done by guiding the knife M in a slide F in the direction of the axis of the bolt while the slide F is guided in the frame of the machine at right angles to the axis of the bolt. The slide F is reciprocated in this direction by a link E operated by a cam D mounted on a revolving shaft. The movable die is reciprocated by a link C pivotally connected with a crank pin on the said cam. For better guiding the link E its end engaging with the cam D may be pivotally connected with a crank arm E' mounted on a shaft E² journaled in the machine frame. For deadening shocks the link E may be made in two parts between which a spring E³ is interposed as shown in Fig. 2.

The movement of the knife M in the direction of the axis of the bolt is brought about by a guide N secured to the frame of the machine on which the knife runs preferably by means of a bowl. The guide is provided with inclines which move the knife toward and away from the bolt with the required speed. The cam groove in the cam is so shaped that at the beginning and at the end of the rolling operation the knife so far recedes from the bolt in a direction at right angles to its axis that the bolt may be conveniently put in and removed from the machine.

The movement of the knife relatively to the axis of the bolt and at right angles to the same in the course of the rolling operation (if according to the process illustrated by Fig. 1* the outer surface of the thread has to be turned down) is secured by properly shaping the cam groove in the cam D.

Instead of one knife M two or more such knives may be used which are carried by different slides F actuated by different cams. Each of such knives may be provided with one or more of the cutting edges serving for turning down the point or end of the bolt, the underside of the bolt head and the outer surface of the thread.

Claims.

1. A process for rolling screw bolts consisting in causing dies to move relatively and parallel to each other at right angles to the axis of the bolt and in contact with the bolt whereby the bolt is caused to roll along both dies and in causing a knife to move in the course of the rolling operation relatively to the bolt in the direction of its axis whereby an edge of such knife turns down the end of the bolt.

2. A process for rolling screw bolts consisting in causing dies to move relatively and parallel to each other at right angles to the axis of the bolt and in contact with the bolt whereby the bolt is caused to roll along both dies and in causing a knife to move in the course of the rolling operation relatively to the bolt in the direction of its axis whereby

an edge of such knife turns down the end of the bolt and another edge of such knife turns down the underside of the head of the bolt.

3. A process for rolling screw bolts consisting in causing dies to move relatively and parallel to each other at right angles to the axis of the bolt and in contact with the bolt whereby the bolt is caused to roll along both dies and in causing a knife to
5
10 move in the course of the rolling operation,

relatively to the bolt in the direction of its axis and also in a direction at right angles to its axis, substantially as and for the purpose described.

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

JULIUS HELLER.

Witnesses:

ARTHUR BAUMANN,
AUGUST FRUGGER.