H. MÜLLER.

PROCESS OF HEADING BOLTS, SCREWS, RIVETS, AND SIMILAR ARTICLES BY UPSETTING.

APPLICATION FILED NOV. 14, 1911.

1,096,555. Patented May 12, 1914.

Fig. 1

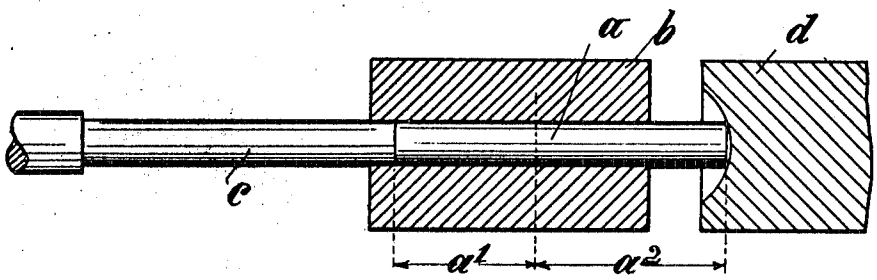
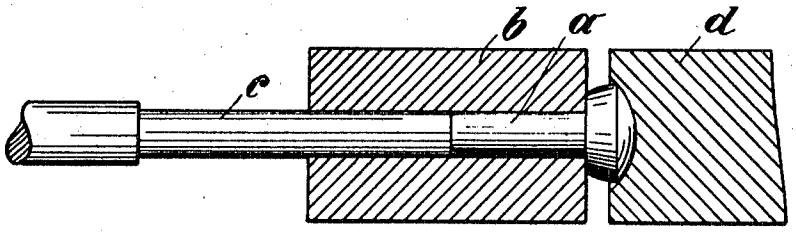


Fig. 2



Witnesses.
Helen Nufer.
Albert Nufer

Inventor.
Hans Müller.

UNITED STATES PATENT OFFICE.

HANS MÜLLER, OF HAGEN, WESTPHALIA, GERMANY.

PROCESS OF HEADING BOLTS, SCREWS, RIVETS, AND SIMILAR ARTICLES BY UPSETTING.

1,096,555. Specification of Letters Patent. Patented May 12, 1914.

Application filed November 14, 1911. Serial No. 660,184.

To all whom it may concern:

Be it known that I, HANS MÜLLER, engineer, a citizen of the German Empire, residing at Hagen, in the Province of Westphalia, Germany, have invented certain new and useful Improvements in the Process of Heading Bolts, Screws, Rivets, and Similar Articles by Upsetting, of which the following is a specification.

In the process of heading bolts, screws, rivets and similar articles by upsetting one of their ends it is customary to place the article into a suitable die or matrix embracing so much of the article as is intended to remain the body or shank of such screw, bolt or rivet, while so much of the article, as is required for a blank to be converted into a head by upsetting, is left to extend from the orifice of the die. By another matrix or die acting as a punch in axial direction a pressure is exerted which is of such force that the blank end becomes upset and thereby attains the desired shape of the head. According to the size and shape of the latter the length of the outstanding blank varies and not unfrequently such length is rather great in proportion to the thickness of the shank and thus the blank is unable to withstand upsetting and is liable to break. Distorted and otherwise defective heads are the result, particularly when being manufactured in hot condition. In order to avoid this disadvantage the upsetting work was heretofore done not all in one time, but in two actions, a preparatory pressure being first exerted in one machine and a final upset in another machine. This way of procedure would require, however, a considerably larger amount of time, and, in addition, two machines instead of one.

My invention relates to an improved method or process of heading such rivets, screws, bolts or similar articles and its object is to devise a way permitting the making of the head by upsetting in one action without exposing the bolt or rivet to a liability to break, even when the blank required for any particular shape of head should be of a length which in proportion to its thickness would exceed its tenacity or limit of resistance to crushing.

In describing my improved process or method I refer to the drawing herewith in which—

Figure 1 illustrates the application of my method, showing the initial stage of making a head as described while Fig. 2 shows it after the finishing of the upset.

According to my invention, in upsetting the blank of a bolt, or other article referred to, only so much of the blank is permitted to extend from the orifice of the die, that its limit of resistance to crushing is by no means overpassed, the shank of the bolt being gradually advanced during the continuation of upsetting and until the whole blank portion intended for the upsetting is out, the advance of the blank for this purpose being arrested simultaneously with or shortly before the completion of the upsetting. In this manner a portion only of the blank, which is never beyond the limit of retroactive tenacity, is subjected to the punching or upsetting action, the feed being only as required by such upsetting operation.

In the drawing a is the working piece, for instance, an ordinary bolt; a^1 indicates the length of the shank of the bolt or rivet; a^2 is the blank to be shaped into a head. The bolt a is inserted in a die b which incloses so much of the shank of the bolt that a very short end only, which is within the limit of tenacity, is standing out. By means of a pin c movable within the die b and acting on one end of the bolt the latter may be pushed forward coming with its other end out of the die. The punch d operating in opposition thereto and the face of which corresponds with the shape of the head to be formed, effectuates the upsetting of the blank as it comes out from the orifice of the die b, being gradually pushed out by means of the said pin c until the entire length of the blank required for the head to be formed is out. The speed at which the bolt is being forwarded within the die b I prefer to be of a rate that simultaneously with or rather previous to the arrival of the punch d at its end position such forward movement is finished.

There is no restriction with respect to the

application of my invention, whether the upsetting is being done in cold or hot condition.

I claim:

1. The method of heading bolts, screws, rivets and similar articles, which consists in simultaneously feeding a blank beyond its die and upsetting the fed material.

2. The method of heading bolts, screws, rivets and similar articles, which consists in exposing beyond the die a portion of the blank insufficient to form the head, upsetting the said projecting portion, and simultaneously with the upsetting action feeding the blank through its die to provide material beyond the same sufficient to complete the head.

3. The method of heading bolts, screws, rivets and similar articles, which consists in exposing beyond the die only so much of the blank as is within the limit of retroactive tenacity when the upsetting operation begins, upsetting the said projecting portion, and simultaneously therewith gradually feeding a further portion of the blank beyond its die.

4. The method of heading bolts, screws, rivets and similar articles, which consists in exposing beyond the die only so much of the blank as is within the limit of retroactive tenacity when the upsetting operation begins, upsetting the said projecting portion, and simultaneously therewith gradually feeding the blank beyond its die until the upsetting is substantially completed.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

HANS MÜLLER. [L. S.]

Witnesses:

HELEN NUFER,

ALBERT NUFER.