(No Model.)

F. MUTIMER.

BOLT HEADING DIE.

No. 378,936. Patented Mar. 6, 1888.

Fig. 1.

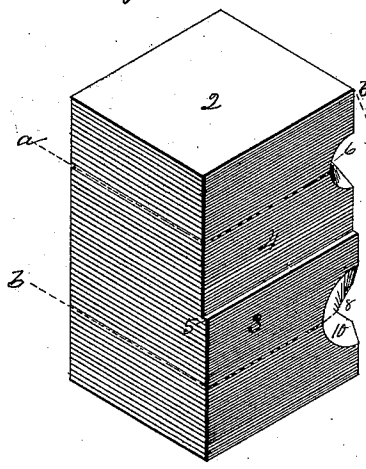


Fig. 2.

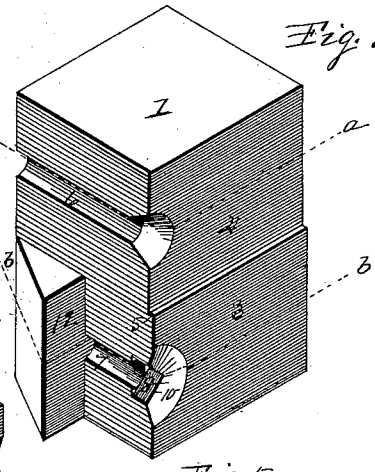


Fig. 5.

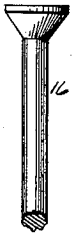


Fig. 6.

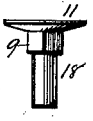


Fig. 3.

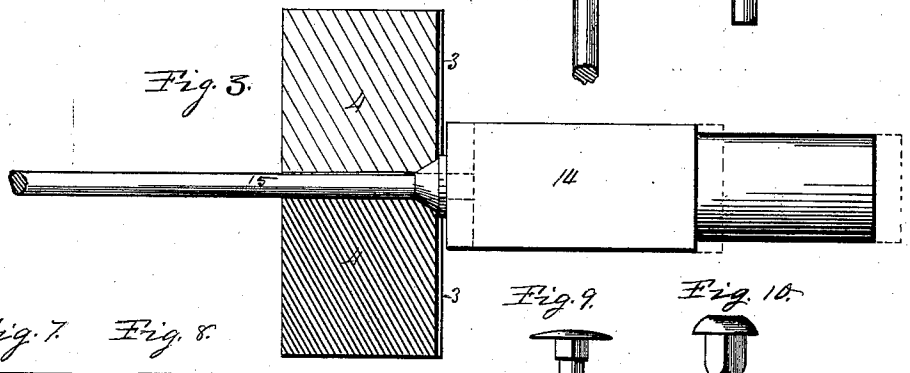


Fig. 7.

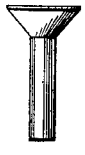


Fig. 8.

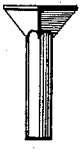


Fig. 9.



Fig. 10.

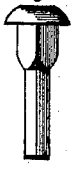


Fig. 4.

Witnesses.
A. O. Behel
E. Behel

Inventor.
Frederick Mutimer
Per Jacob Behel,
Atty.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

FREDERICK MUTIMER, OF ROCKFORD, ILLINOIS, ASSIGNOR OF ONE-HALF TO THE ROCKFORD BOLT WORKS, OF SAME PLACE.

BOLT-HEADING DIE.

SPECIFICATION forming part of Letters Patent No. 378,936, dated March 6, 1888.

Application filed September 14, 1887. Serial No. 249,608. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK MUTIMER, a citizen of the United States, residing in the city of Rockford, county of Winnebago, and State of Illinois, have invented certain new and useful Improvements in Bolt-Heading Dies, of which the following is a specification.

This invention relates to the manufacture of bolt-blanks. Its object is to manufacture large-headed bolt-blanks from rods or bars of the required size at a single heating of the rod or bar.

In the manufacture of bolt-blanks from cylindrical bar material it is found impractical to upset or compress more in length of the bar than twice its diameter at a single operation. This arises from the fact that if more in length of the bar than about twice its diameter is subjected in a single operation to endwise compression it is liable to bend or kink and form an imperfect head.

Heretofore, so far as known to me, bolt-blanks having large heads in proportion to the diameter of the shaft of the blank have been made from blanks first cut to the required length from bars of the required diameter, then heated and headed at one or more operations in even-faced dies in which the first compression or upsetting of the blank would thin the edges of the head portion, which caused the edges to cool to such an extent that in the second operation, without reheating to complete the blank, its edge portions would crack open and form a broken ragged outer edge, which required grinding, turning, or milling or other equivalent operation to produce a finished blank.

To obviate the foregoing difficulties and produce blanks uniform in length cut from a bar to the required length in the same operation, I have designed and constructed the dies represented in the accompanying drawings, in which—

Figures 1 and 2 represent a two-part bolt-heading die in isometrical view. Fig. 3 is a horizontal section on dotted line *a* on Figs. 1 and 2, showing the dies closed on the bar from which the bolt-blank is made. Fig. 4 is a horizontal section on dotted line *b* on Figs. 1 and 2, showing the dies closed on the finished bolt-blank. Fig. 5 represents the bar after first compression; and Figs. 6 to 10, inclusive, represent some of the varieties of bolt-blanks having enlarged heads which may be produced in a second compression in my improved dies.

The two portions 1 and 2 of my improved dies are made with a lower portion, 3, and a reduced upper portion, 4, forming a shoulder, 5, about the center of their height on the face of the dies on which the heads of the bolt-blanks are formed, whereby the edge of the head is left thicker after the first advance of the plunger than it is intended to be when finished in the finishing-die by the subsequent advance of the plunger.

These dies are provided with semicircular grooves 6 and 7 formed in the face of their meeting edges opposite each other, and are of a diameter to snugly embrace the bar from which the bolt-blank is to be made to hold it against the action of the plunger. The end of the groove 6, opening on the heading-face of the upper portion of the dies, is preferably of a countersink form, into which the bar is compressed by the first action of the dies and plunger, and the end of the groove 7, opening on the heading-face of the lower section of the dies, is of a conformation to give the required form to the head of the bolt-blank when the bar is compressed in the second action of the dies and plunger. In this instance the end of the groove 7 consists of a section, 8, rectangular in cross-section when the dies are closed to give conformation to the neck 9 of the blank, and an outer concave section, 10, to give conformation to the under face of the head 11, which is of disk form, with under face slightly convex.

A cutter, 12, projects from the lower rear portion of the meeting face of the die 1 in position to enter a recess, 13, formed in the lower rear corner and meeting face of the die 2, and in the closing movements of the dies cuts the bolt-blank from the bar and serves as a stop to the blank to resist the action of the plunger in forming the head of the blank, and the distance from the heading-face of the dies to the cutter determines the length of the finished bolt-blanks, which will be substantially identical in length.

The plunger 14, employed to compress the end of the bar into the dies, is of a width about

equal to the height of the dies, and in this instance its compression-face is a plane even surface to form the outer face of the head of the bolt-blank.

The dies 1 and 2 and the plunger 14 are designed for use in machines now in use in the manufacture of bolts, and their outside dimensions are such as to enter the die-seat of the particular machine in which they are intended to be used, and their reciprocating movements toward and from each other are such as to freely admit the insertion of the bar from which the blank is to be made, and to grasp and hold it firmly against the action of the plunger.

In the manufacture of bolt-blanks, in my improved dies the heated rod is first placed in the upper groove, 6, in the recessed portion of the die in which its end portion is compressed by the plunger into the countersink, as shown at 15, Fig. 3, and 16, Fig. 5, and on the opening of the dies it is dropped into the lower grooves, 7, when in the closing of the dies in the second operation the blank will be cut from the bar and compressed by the second action of the plunger into the dies, as shown at 17, Fig. 4, and in the second opening of the dies the finished bolt-blank 18 will drop from the dies. In this instance I have shown and described my improved dies recessed on the face side on which the head of the bolt-blank is formed; but this recess in the dies may be omitted, and instead thereof the working-face of the plunger may be recessed to produce the same results.

In the use of my improved bolt-blank dies the movement of the plunger is adjusted to form a stop to the bar from which the bolt-blank is made when placed in the dies, as shown in the dotted lines in Figs. 3 and 4, to gage the length of the bar, to furnish the required material to form the head portion of the bolt-blank. In this instance I have represented my improvements in dies fitted for the manufacture of the headed bolt-blank shown at 17 and 18; but evidently my improved dies may be made to produce bolt-blanks of other varieties, some of which I have represented in the figures from 7 to 10, inclusive, in which the head and neck, or the head or neck, of the blank is of large size in proportion to the shaft of the bolt-blank or to the bar from which they are made, and in the manufacture of some varieties of bolt-blanks, such as represented at Figs. 9 and 10, in which the head or a portion thereof projects beyond the heading-face of the clamping-dies, Figs. 1 and 2, a recess is formed in the heading-face of the plunger to give conformation to such portion of the head, all of which is within the scope of my invention. I have also represented the cutter 12 as projecting from the lower rear corner of one portion of the die to enter a recess, 13, in the lower rear corner of the opposite die, which arrangement I prefer; but it is evident that the position of the dies may be reversed, in which instance the cutter would occupy the upper rear corner of the dies, and the first compression of the end of the bar would be produced in the lower groove instead of the upper groove, as shown.

I claim as my invention—

1. Bolt-heading dies consisting of clamping-dies and a plunger, said clamping-dies grooved on their meeting faces to clamp the bar from which to make the bolt-blank, the end of said grooves on the heading-face of the dies enlarged, one to receive the first compression of the bar and the other to give conformation to the head portion of the bolt-blank, said dies and plunger having a recess between a portion of their meeting faces, substantially as and for the purpose set forth.

2. Bolt-heading clamping-dies grooved on their meeting faces to clamp the bar from which to make the bolt-blank, the end of said grooves on the heading-faces of the dies enlarged, one to receive the first compression of the bar and the other to give conformation to the head portion of the bolt-blank, said dies recessed on their faces toward the plunger, whereby a greater distance is left between the face of the die and the face of the plunger at the termination of one compression than at the termination of another compression, substantially as and for the purpose set forth.

3. The combination, with bolt-heading clamping-dies provided with different sets of blank-receiving grooves on their meeting faces, of a cutter projecting from the grooved face of one of the dies and constructed to enter a recess in the grooved face of the opposite die and to form an abutment for the end of the bolt during the pressure of the plunger, substantially as set forth.

4. The combination, with the bolt-heading clamping-dies, grooved on their meeting faces to clamp the bar from which to make the bolt-blank and to receive the bolt-blank, the end of the said grooves in the heading-faces of the dies enlarged, one to secure the first compression of the bar and the other to give conformation to the head end portion of the bolt-blank, of the cutter to cut the bolt-blank from the bar, said cutter projecting from one of the dies to enter a recess in the opposite die to form an abutment for the end of the bolt during the finishing of the bolt, substantially as set forth.

FREDERICK MUTIMER.

Witnesses:
C. R. WISE,
A. O. BEHEL.