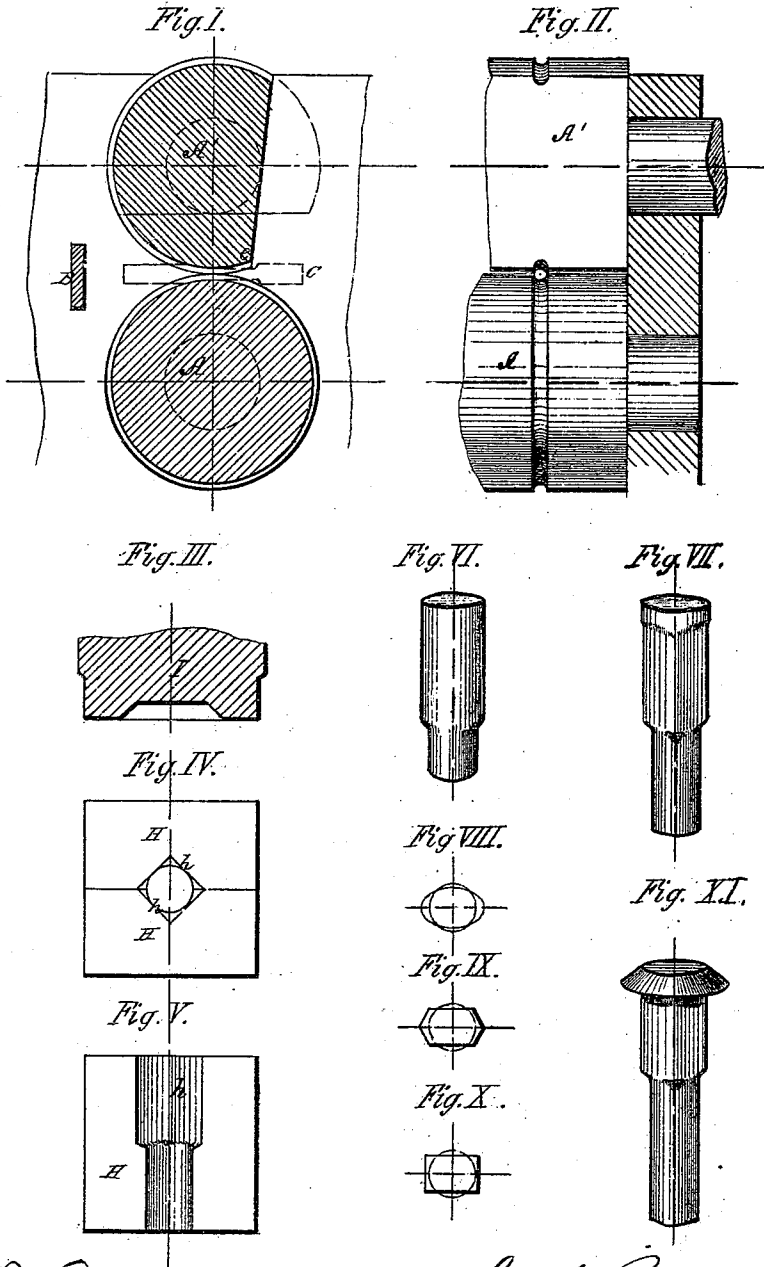


G. C. Bell,

Making Bolts.

No. 94,276.

Patented Aug. 31. 1869.



Josef J. Bonnet  
W. A. Becker } WITNESSES

G. C. Bell  
by F. L. V. Wyatt } INVENTOR

# UNITED STATES PATENT OFFICE.

GEORGE C. BELL, OF BUFFALO, NEW YORK.

## IMPROVED METHOD OF MAKING SQUARE-NECKED BOLTS.

Specification forming part of Letters Patent No. 94,276, dated August 31, 1869.

*To all whom it may concern:*

Be it known that I, GEORGE C. BELL, of the city of Buffalo, in the county of Erie and State of New York, have invented a certain new and useful Improvement in the Manufacture of Bolts; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, forming part of this specification.

The object of my improvement is to dispense with the necessity of upsetting preparatory to forming the square shank, and to enable the body or cylindrical portion of the bolt to be properly formed by a single operation of the rollers or swages employed, as the case may be.

In accomplishing this, my invention consists in employing, in the manufacture of square-necked bolts, oval or equivalent polygonal-shaped rods, the cross-sectional area of which shall be sufficient to enable the square shank to be formed by swaging without previously upsetting, while the smaller diameter of such rods shall be less than that of the body of the bolt, so as to enable a single operation of the rollers or swages to reduce it to the required form.

To enable others to practice my invention, I will now describe the same, referring to the accompanying drawings, in which—

Figure I is a cross-section of the rolls employed in forming the body of the bolt, which is shown in red lines. Fig. II is a front elevation thereof. Fig. III is a vertical section of the head-forming die. Fig. IV is a plan of the dies for swaging the square shank. Fig. V is a face view of one of the square dies; Fig. VI, a view of a bolt-blank after the cylindrical portion has been formed; Fig. VII, a view of the same after partially acted on by the square dies, and just before the contact of the head-forming die; Figs. VIII, IX, and X, cross-sections of some of the differently-formed rods which may be employed in making bolts after my improvement. Fig. XI is a perspective view of a bolt with body, neck, and head formed.

Like letters of reference designate like parts in each of the figures.

A A' are the two rollers. The former may be loosely mounted, and operated by frictional contact. The latter is of segmental form, as

shown, and revolves in the direction indicated by the arrow, Fig. I.

B is a stop arranged at the back side of the rolls, which is adjusted to or from the same, according to the required length of the body of the bolt to be formed, so as to form a gage therefor.

The segmental form of the roll A' leaves a sufficient space between it and the roll A during a portion of its revolution, as shown in red lines, Fig. I, to permit the insertion edge-wise of the bolt-blank C, which is introduced from the front till it abuts against the stop B.

The heated rod is held against this stop until the point *e* engages with the blank, which it bites at the required point and carries forward, forming the cylindrical portion of the bolt, as shown in Fig. I, by a single passage through the rolls.

This capability of thus reducing the body of the blank to a cylindrical form by a single operation of the rolls (or dies, when they are employed instead) is obviously due to the difference in the two diameters of the rod and the fact that the shorter diameter is less than that of the body of the bolt to be produced therefrom, so that the lateral expansion of the blank, which results from the vertical contraction by the rolls, will be just sufficient to bring the rod into cylindrical form of the required size. This is illustrated in Figs. VIII, IX, and X, the red lines indicating the body of the bolt after the reduction has taken place.

The body of the bolt being thus formed, the blank is reheated and then placed between the dies H H, having rectangular grooves *h*, of the length of the required square shank, or of combined square and circular grooves, when the dies are required to clamp the body of the bolt. The action of the dies compresses the blank into its proper square form, with sharp corners, such as cannot be produced by simply upsetting.

As the dies close on the iron the cap-shaped die I advances and forms the head by upsetting that portion of the blank which projects beyond the dies in the well-known manner of other bolt-heading machines already in use.

I do not claim the dies, rolls, or any other machinery that may be employed in the application of my improvement. I am also aware

of the patent of D. E. Adams, September 18, 1866, for forming a square neck upon a bolt by first upsetting a portion thereof into an elliptic form; also, of the patent of W. J. Clark for making a square neck on a round rod by compression in dies; and also the patent of Bunton & Davis, December 29, 1868, for forming a square neck from a blank having different diameters of cross-section; but in this case the blank is reduced or drawn out both in the neck and body; but

What I claim as my invention, and desire to secure by Letters Patent, is—

The method herein described of forming square necks on bolts from rods having one diameter less than the other without upsetting, by first reducing the same, by means of rollers, to form the body, and then squaring the neck by compressing it between swaging-dies.

GEO. C. BELL.

Witnesses:

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