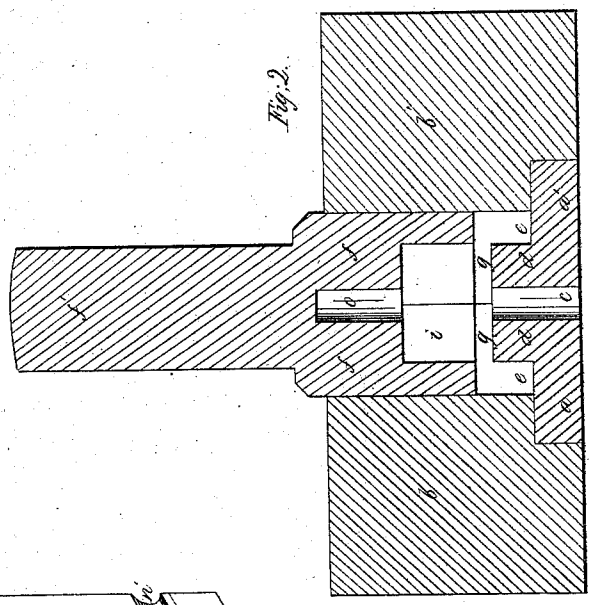
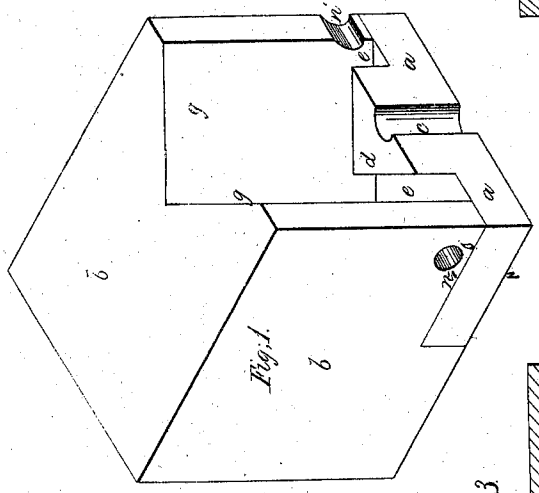
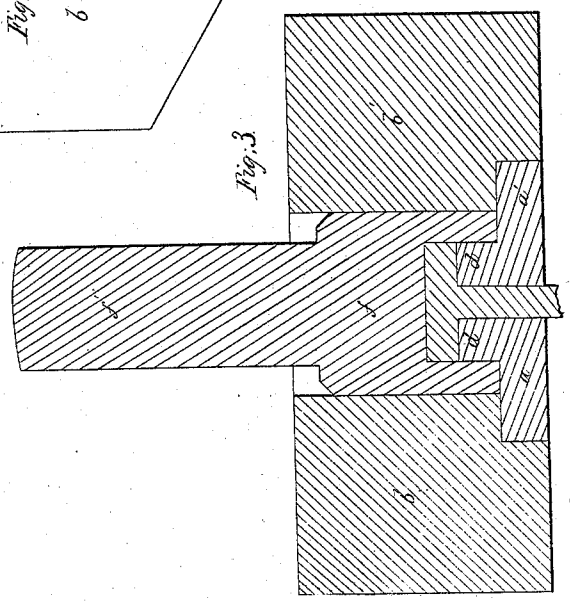
R. Gracey.

Die for Making Bolts.

No. 83,377. Patented Oct. 27, 1868.







Witnesses.
Robt McClelland.
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United States Patent Office.

ROBERT GRACEY, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 83,377, *dated October* 27, 1868.

IMPROVED DIE FOR BOLT-MAKING MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, ROBERT GRACEY, of the city of Pittsburg, in the county of Allegheny, and State of Pennsylvania, have invented a new and useful Improvement in Heading-Dies for Making Bolts; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, in which—

Figure 1 is a perspective view of one of my bolt-heading dies, showing the working parts thereof;

Figure 2 is a section, formed by a plane passing through the axis of the dies and heading-tool, and showing the position of the heading-tool at the beginning of a stroke; and

Figure 3 is a similar sectional view, showing the position of the heading-tool at the end of the stroke, when the bolt is formed.

Like letters of reference indicate like parts in each.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and mode of operation.

The die-blocks *b b'*, both movable, or one movable and the other stationary, I attach to any convenient machinery for imparting to them the motions ordinarily employed in the manufacture of bolts, as also the heading-tool *f*.

To the die-blocks *b b'*, I attach, in any convenient way, the dies *a a'*, and along the face of each one make a groove, *c*, of semicircular or other oval shape, such as may be required to enable the dies securely to gripe the rod from which the bolt is to be made, give the shank of it the proper shape, and hold it while a head is being swaged on its forward end.

The ends *d* of the dies *a a'*, against which the lower face of the bolt-head is to be formed, I make of such size and shape, that between them and the faces of the die-blocks *b b'*, there shall extend on all sides a recess, *e*, of any desirable depth and width.

f is a heading-tool, attached to a shaft, *f'*, and of the proper size to work snugly between the faces *g* of the die-blocks *b b'*, when the dies *a a'* are closed.

The lower face of the heading-tool *f* has a recess or socket, *i*, so made that the header *f* may slide neatly over and on to the upper ends *d* of the dies *a a'*, and, at the same time, leave room between its base and the ends *d* for a bolt-head to be formed.

The shape of the socket *i* in cross-section may be square, hexagonal, or of such other shape as it may be desired to give the bolt-head.

The base of the recess or socket *i* may also be so shaped as to give to the upper face of the bolt-head any form required.

By boring a socket-barrel, *o*, in the base of the recess *i*, of the size and shape of the shank of the bolt to be made, I adapt the devices named for use in making collar-bolts, as hereinafter described.

In order to prevent the dies *a a'* from being unduly heated, I introduce into the recess *e*, by an an aperture, *n*, a stream of cold water, which entirely fills such recess, and which is, by the fall of the header *f*, forced out through the aperture *n'*, such aperture *n'* being somewhat less in size than the aperture *n*, so as to insure the filling of the groove *e*. The aperture *n* has a pipe for the supply of water.

The mode of operation is then as follows: The header *f* being in the position shown in fig. 2, an iron rod, previously heated, is introduced between the dies *a a'* as they open, till a sufficient amount of metal projects beyond the ends *d* to form a bolt-head of the required size. The dies *a a'* are then closed on the rod and gripe it tightly in the groove *c*. At the instant of the closing of the dies *a a'*, the water is turned on at the aperture *n* by any mechanical device ordinarily used for such purpose, and immediately fills the groove *e*. By a drop-weight, hammer, cam, or other equivalent device, the header *f* is at once forced down to the position shown in fig. 3, and thus swages a head on the end of the rod, between the ends *d* and base and sides of the socket *i*.

It will be observed that the sides of the socket *i* shut down in the recess *e*, over and on to the ends *d* of the dies *a a'*. I thus wholly avoid the formation of a fin or frayed edge along the edges of the lower or upper faces of the bolt, which it has been found exceedingly difficult to do, and is as desirable as it is difficult.

I avoid the injurious strain usual to bolt-machines, in which some part of the header plays against a fixed die.

I avoid loss from compressed air, as the air all escapes along with the water by the aperture *n'*.

I thus save a considerable expenditure of power, and produce a superior bolt.

As soon as the bolt-head is thus formed, the header *f* is withdrawn, the water again fills the groove *e*, the dies *a a'* open, and, the bolt having previously been cut off by the devices ordinarily used for that purpose, drops out of the groove *c*, or is removed, if necessary, by strippers or knockers, or other equivalent well-known device.

The opening of the dies *a a'* cuts off the supply of water.

To make a collar-bolt, which is, practically, a double bolt with a collar between its two ends, I use a heading-tool, *f*, (fig. 2,) having a socket-barrel, *o*. The rod is then heated, and its forward end introduced into the socket-barrel *o* a sufficient distance to give one end of the bolt required. The dies *a a'* then close, the header *f* descends as above described and swages a collar on the bolt between the ends *d* of the dies *a a'* and the base of the recess *i*, as above set forth.

The remainder of the process is as already described.

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

1. The combination of the dies *a a'*, die-blocks *b b'*, and plunger *f*, with or without the socket *o*, said parts being arranged substantially as described.

2. The griping-dies *a a'*, with raised projection *d*, in combination with the die-blocks *b b'*, having water-passages *n n'*, when so arranged, substantially as hereinbefore described, as to form an enclosed space for the passage of water around the raised portion of the dies whenever the heading-tool is withdrawn.

In testimony whereof, I, the said ROBERT GRACEY, have hereunto set my hand.

ROBERT GRACEY.

Witnesses:

ELL TORRANCE,

G. H. CHRISTY.