Sheet 1-2 Sheets.

W. Shields.

Die for Making Square-Headed Bolts.

No. 74616 Patented Feb. 18, 1868.

Fig: 1

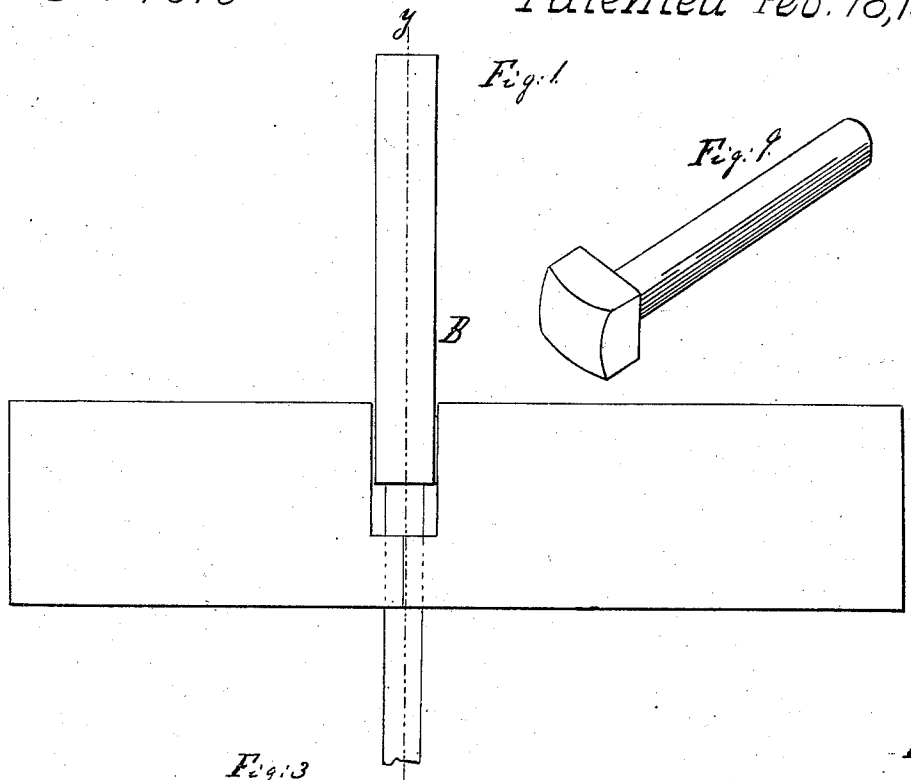


Fig: 2

Fig: 3

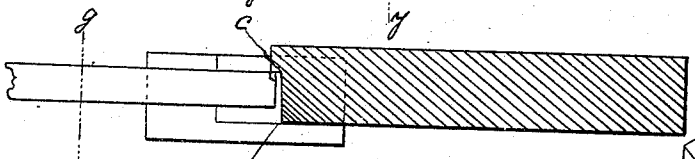


Fig: 4

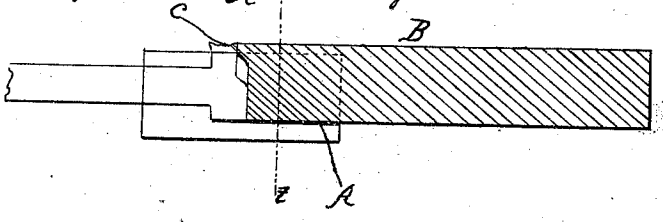


Fig: 8

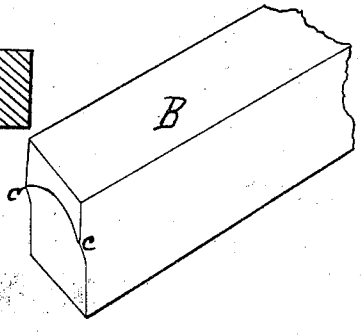
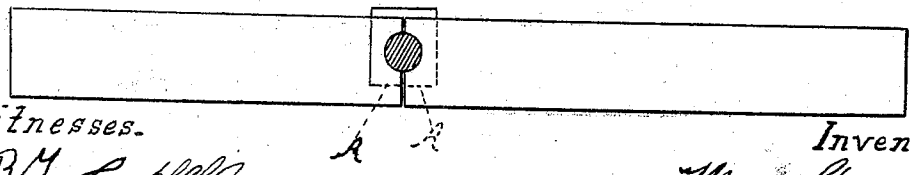


Fig: 5



Witnesses.
R.J. Campbell
Edw. Schafer

Inventor
Wm. Shields
by his agents
Mason, Fenwick & Lawrence

Sheet 2 - 2 Sheets.

W. Shields.

Die for Making Square-Headed Bolts.

No. 74616 Patented Feb. 18, 1868.

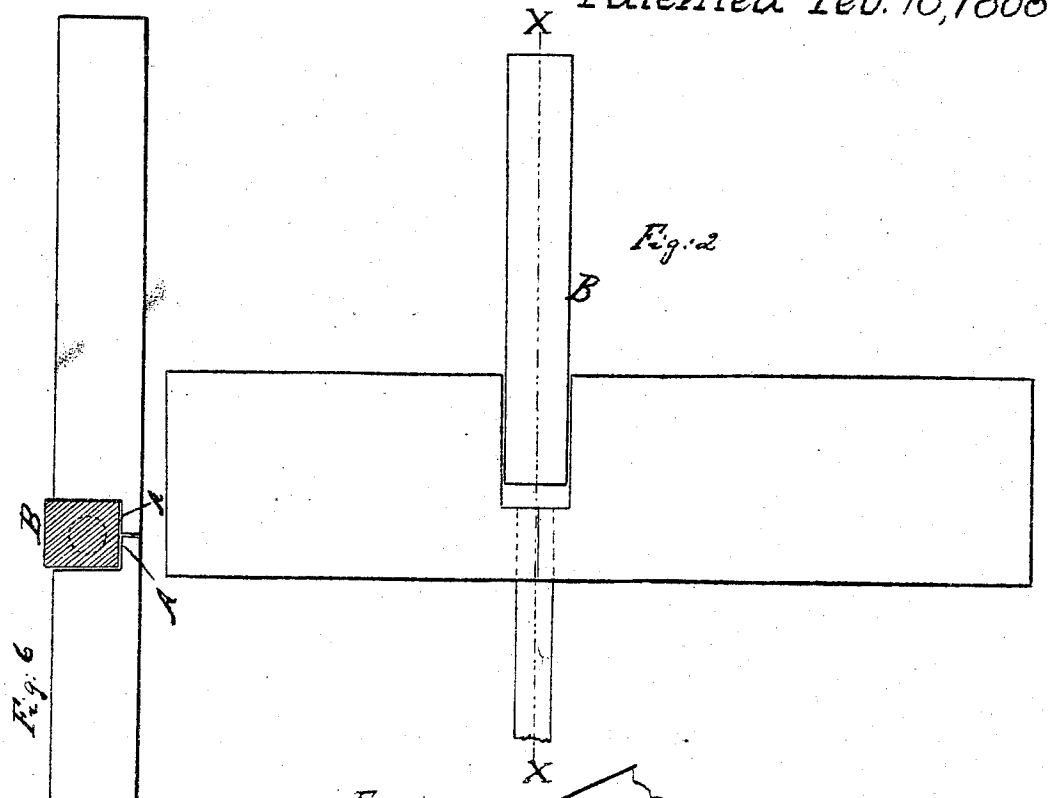
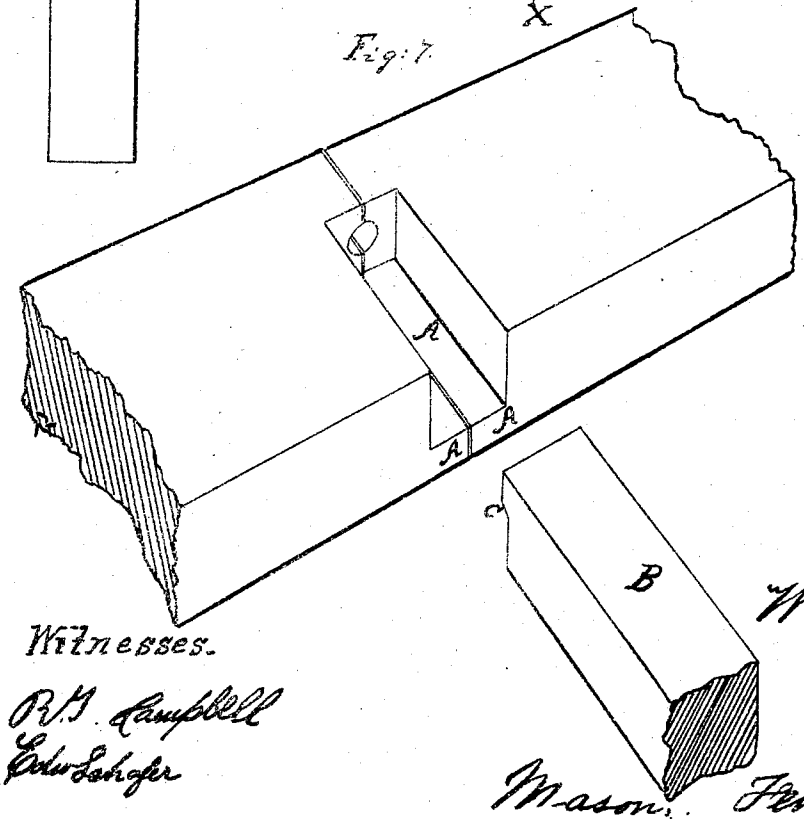


Fig. 2

Fig. 6

Fig. 7



Witnesses.

R. S. Campbell

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Inventor.

Wm. Shields

by his agents

Mason, Fennwick & Lawrence

United States Patent Office.

WILLIAM SHIELDS, OF PHILADELPHIA, PENNSYLVANIA.

Letters Patent No. 74,616, *dated February* 18, 1868.

IMPROVED DIE FOR MAKING SQUARE-HEADED BOLTS.

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, WILLIAM SHIELDS, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Dies for Making Square-Headed Bolts; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top view of my improved dies and the heading-plunger just in position for forming the head on a cylindric rod or bolt.

Figure 2 is a top view of the same parts as they appear when the head has been formed.

Figures 3 and 4 are sectional views in the lines *y y* and *x x* of figs. 1 and 2.

Figure 5 is a section in the line *g g* of fig. 3.

Figure 6 is a section in the line *t t* of fig. 4.

Figure 7 is a perspective view, showing the dies and heading-plunger.

Figure 8 is a perspective view of the front end of the heading-plunger.

Figure 9 is a perspective view of the finished bolt, ready to be screw-threaded.

To enable others skilled in the art to make my invention, I will proceed to describe the same with references to the drawings.

The dies and heading-plunger, herein shown and described, are arranged and operated in precisely the same manner as now commonly practised, and it will be only necessary for me to describe the improvement upon these dies which I have made.

My improvement consists in making a horizontal flange or shoulder, A, on each of the jaws which form the die. This shoulder extends horizontally from near the base of the jaw to the centre of the hole, through which the bolt-rod is passed, and there being a shoulder on each jaw, and both shoulders being of the same length, horizontally, it follows that the die, within which the bolt-head is formed, will have three sides, that is, two vertical sides and one horizontal side or wall; it being open at top but closed at bottom, and on two sides, as shown in figs. 6 and 7, when the operation of heading a bolt is being performed. It will be understood that one of the jaws of the die is made to reciprocate while the other is stationary; usually the left jaw is the movable one. The heading-plunger also reciprocates. These motions, in one of the jaws and in the heading-plunger, are very familiar in bolt-headers, and need not be more particularly referred to here. Bolt-heading dies may have been made with all four sides closed, but not with any good success, unless provision be made for the exit or crowding back of surplus metal, termed fins, during the heading process. By closing the bottom of the die, and leaving the top wholly open, a free exit for the fins, as they are removed or crowded back, is secured. The removal of the fins, or the crowding back thereof, is effected by means of a cutter, *c*, formed on the face of the plunger B, as shown in fig. 8. This cutter also gives a rounding finish to the corners of the bolt-head during the forming and squaring operation. The cutting off of the fins or crowding back thereof, and the shaping of the bolt-head during the squaring operation, are due to the fact that the ends of the cutter stand just level with the top of the jaws of the dies, as illustrated in fig. 4.

I am aware that a plunger with a die which is open at both top and bottom has been used, and that fins have been removed or crowded back during the heading operation, and therefore I lay no claim thereto.

The advantage of my die with closed bottom and open top, over a die closed on all sides, is this: In the latter there is great liability of the fins working in between the jaws and the plunger, and a very objectionable spike being produced, whereas in the former the fins are always removed or crowded back, and a very perfect bolt produced. The advantage of having the bottom of the die closed and the top open is this: The bolt-head is supported on three sides during the formation, and thus the liability of the head being made oblong vertically is greatly overcome; and beside this, it is only necessary to turn the bolt three, four, or five times in its die in order to get a perfectly square head, whereas when there is no support at the base of the die, the metal, under the action of the plunger, is very apt to assume an oblong form when upset between the side jaws and the front shoulders thereof, and owing to this it is often necessary to turn the bolt from ten to fifteen times in its die before the desired square form is secured, and even then the different bolts will have different forms of heads, some slightly oblong, some nearly square, and others, by chance, square.

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

The combination of the jaws with flanges A A and the plunger B, constructed, and arranged, and operating substantially as and for the purpose herein described.

WILLIAM SHIELDS.

Witnesses:

B. F. WARREN,

JOSEPH GILPIN.