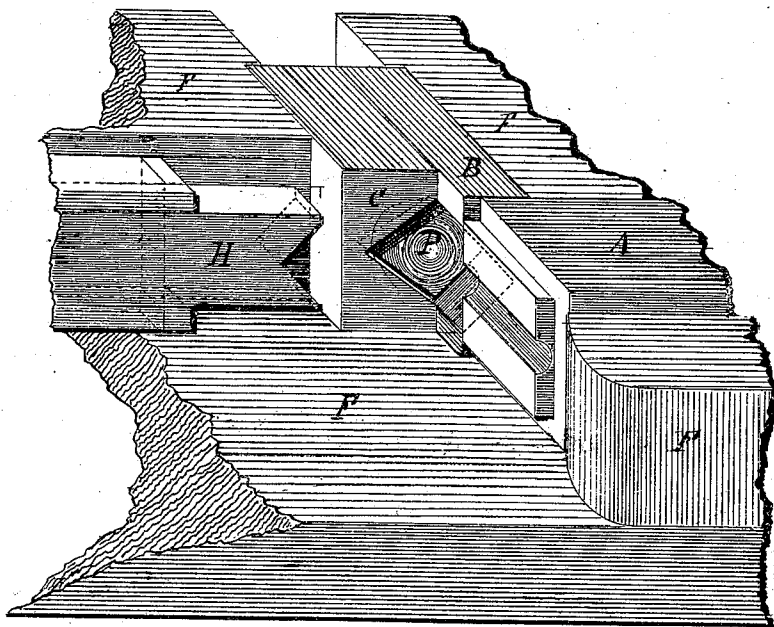


*P. Eley,*

*Bolt Header.*

*No. 113,280.*

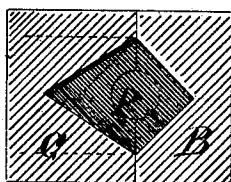
*Patented Apr. 4, 1871.*



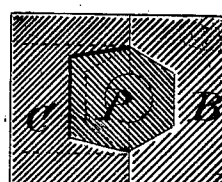
*fig: 1*



*fig: 2*



*fig: 3*



*fig: 4*

*Witnesses:*

*A. Gengembel Huber*  
*Ch. D. Wallick*

*Philip Eley Inventor.*

# UNITED STATES PATENT OFFICE.

PHILIP ELEY, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS,  
TO CHARLES WALLICH, GEORGE HICOCK, AND ALEXANDER YOUNG.

## IMPROVEMENT IN BOLT-HEADING DIES.

Specification forming part of Letters Patent No. **113,280**, dated April 4, 1871.

I, PHILIP ELEY, of the city of New York, in the county and State of New York, have invented certain Improvements in Heading-Tools for Bolt-Machines, of which the following is a specification:

### *Character and Object of the Invention.*

This invention relates to tools for heading bolts, spikes, &c.; and it consists in the combination of a heading-box and side hammer with a certain new heading-plunger, by means of which bolts, spikes, &c., may be made by machinery in a more perfect manner than is now done on the known bolt-making machines.

The tools of bolt-making machines now in use are so constructed and operated that they leave fins or projections at all the parts of the bolt corresponding to that part of the set of tools where play or looseness is produced between the tools or parts of the box in which the head is to be formed. This fin is on the top of the head of the bolt when the heading-plunger is of the dimension of the head, and it works in a solid or fixed head-box. The fin, on the contrary, is formed on the side of the head when the bolt is forged in a head-box formed of pieces opening laterally.

The characteristic of my invention is the new heading-plunger, whose cross-section is such that it will fit snugly in a half-box the cross-section of which is a counterpart of the half of the shape which the head of the bolt to be made is intended to retain when finished, while the opposite side is larger than the half of said shape, so that the said plunger will project over the head of the bolt on one half of it, and, striking thereon, will beat down, upset, and crowd in any fin which may have been left on the top of the head of the bolt by the action of the plunger on the side where it slides and fits in the heading-box.

This heading-plunger I use in combination with a heading box or anvil and a side hammer having suitable shaped end, to act as a swage on both halves of the side of the head of the bolt, as fully illustrated by my drawing and further described.

### *Description of Drawing.*

Figure 1 represents an isometrical perspective view of my improved dies or tools for head-

ing bolts by machinery, with part of a frame shown, simply to retain each member of the combination in its proper place, and one of the gripping-dies removed, not to obstruct the view of the hammer and heading-plunger. Fig. 2 is a cross-section of my heading-plunger, heading-box, and slide, representing tools for making a round head to a bolt. Fig. 3 is a similar view of tools for making a square-head bolt, and Fig. 4 is also a similar view of tools intended to shape a six-corner-head bolt.

I have given these last three figures so as to illustrate clearly the principle upon which my invention is based, and not to limit myself to the exact shape of the heads there illustrated.

### *General Description.*

F is the frame of the machine, which has to be built according to the demand of other parts of the bolt-machine not illustrated here, and, therefore, which is only represented in my drawing as retaining in their proper relative position and relations each of the tools forming the set or combination required for heading a bolt. A is one of the gripping-dies, the other one being removed, made and operated in any of the known manners. B is the heading-anvil, having for cross-section a figure representing on one side a counterpart of one half of the cross-section of the head of the bolt to be forged therein. One part of this heading-anvil B acts as an anvil or swage, whereon one half of the head of the bolt receives its shape, the balance acting as a slide for the heading-tool P. H is a side hammer, the face of which is shaped so as to present a counterpart of one half of the head of the bolt, and which is combined and operated with the anvil B in such a manner as to form with it the full sides of a box or cavity for shaping the lateral part of the head of the bolt. This hammer H is operated upon by any appropriate mechanical device to give it the proper motion and action. C is a slide for one half of the heading-plunger to play in, and which, therefore, presents a channel suitable to receive said plunger and act as a slide-box therefor, in combination with the slide part of the anvil B.

P represents my improved heading plunger or hammer, the cross-section of which is such that one half will correspond and fit upon one

half of the head to be forged upon the bolt, while the other half is made larger than the half of the head of the bolt projecting thereon, overhanging said head of all that part indicated in my drawing in Figs. 2, 3, and 4 by the dotted lines, which indicate the shape of the head of the bolt, and the line of boundary of the cross-section of the slide-box C.

The end of the heading-plunger P is made concave or flat, as required, and, in fact, with any design intended to finish the top of the head of the bolt; but in all cases the plunger projects over on one half of the head of the bolt, in order that its action may destroy on that side any fin which may be formed by the action of the other side of the plunger, where it is shaped so as to slide inside of the heading-box B.

The gripping-dies A A, the plunger P, and the hammer H are acted upon by any suitable mechanical devices to cause them to come

into action at the proper time, each in turn, to do its work, gripping the bar, upsetting the same, and swaging the head into shape; and after these three operations are performed the bolt is turned one-quarter, one-half, one-sixth, or any fraction of a turn, as the case may be, and the series of operations repeated, whereby a perfect head is obtained, free from fins, and of an excellent finish.

*Claim.*

The combination of the stationary heading-anvil B, stationary guide C, movable heading-plunger P, and heading-hammer H with the gripping-dies A, all arranged as and operating substantially in the manner specified, and for the purpose set forth.

PHILIP ELEY.

Witnesses:

JAMES P. HARPER, Jr.,  
H. GENGEMBRE HUBERT.