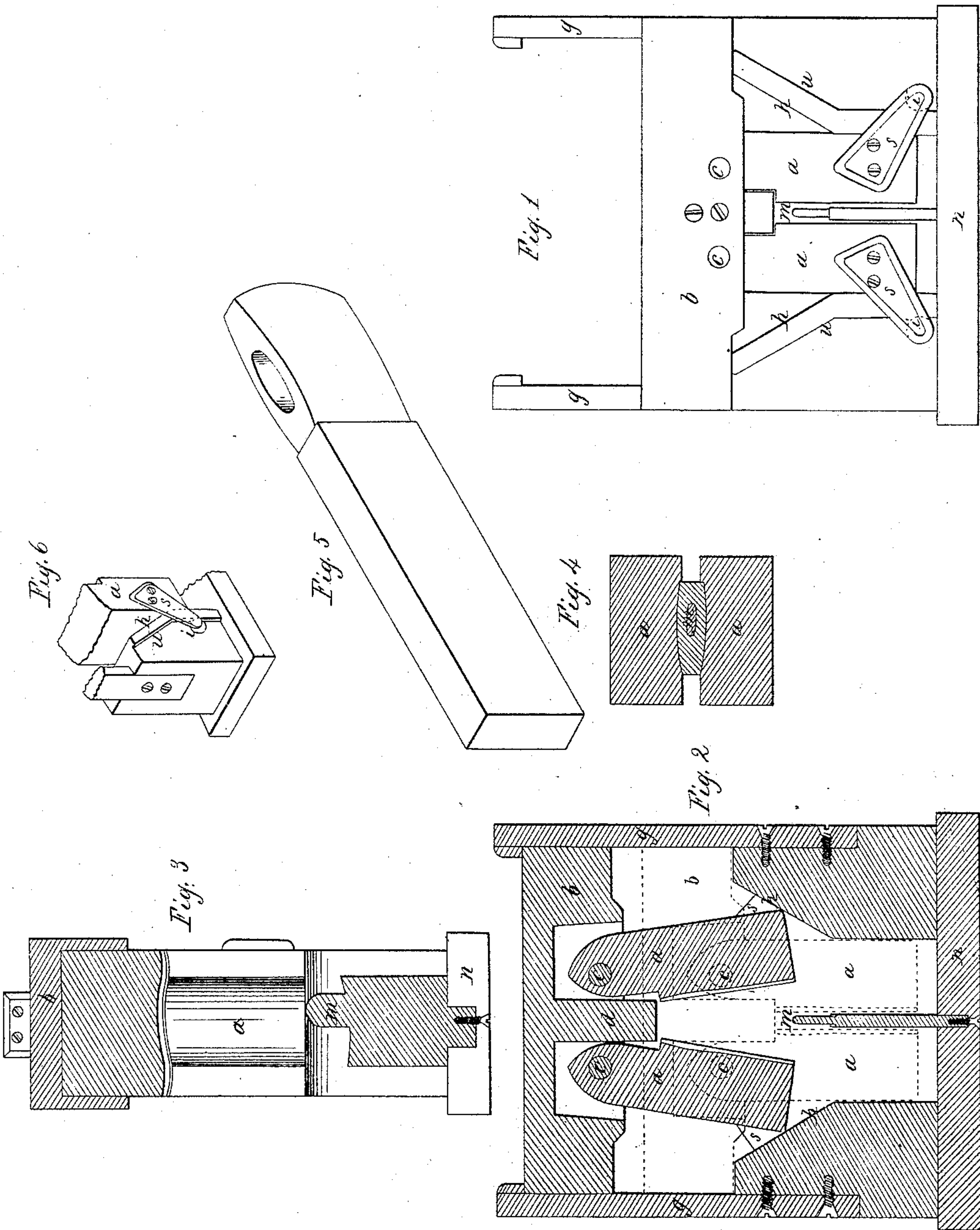


*L. Dodge.*

*Making Axes.*

*N<sup>o</sup> 31,660.*

*Patented Mar. 12, 1861.*



*Witnesses*  
*J. E. Sloyd*  
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# UNITED STATES PATENT OFFICE.

LEVI DODGE, OF WATERFORD, NEW YORK.

## FORMING AND PUNCHING ARTICLES OF IRREGULAR FORM.

Specification forming part of Letters Patent No. 31,660, dated March 12, 1861; Reissued October 10, 1865, No. 2,084.

*To all whom it may concern:*

Be it known that I, LEVI DODGE, of Waterford, in the county of Saratoga and State of New York, have invented an Improvement  
5 in the Manufacture of Axes, Hatchets, and Analogous Articles of Iron of Irregular Forms, and that the following is a full, clear, and exact description of the principle or character which distinguishes it from all  
10 other things before known and of the usual manner of making, modifying, and using the same, reference being had to the accompanying drawings, of which—

Figure 1, is an elevation of the matrices  
15 or dies closed; Fig. 2, a longitudinal section showing the dies closed and open; Fig. 3, a cross section through the middle of the machine between the dies. Fig. 4, is a cross section through the dies and ax head, and  
20 Fig. 5, a bar of iron with an ax head formed previous to its being cut off. Fig. 6 is a detached view showing the devices for opening the dies.

My invention relates to the punching of  
25 articles of irregular forms when such articles are within the dies or matrices as herein-after described. For illustration of the practical working of the invention I will here represent the matrices or dies for forming  
30 ax or hatchet heads and the punch adapted to punching the eyes within the matrices.

It has been hitherto deemed impracticable to punch the eyes of axes within the forming dies and the result of punching them when  
35 not confined has been a spreading and splitting of the metal and drawing the iron down as the punches enter the bar. By my invention the punching is effected while the article is confined within the matrices and  
40 during the process of formation or it may be punched in the same or similar matrices subsequent to the formation, the operation in the latter case not being so expeditious, but inasmuch as the dies or matrices are for  
45 making articles of irregular or swelled or bulging form by simultaneous operation on all or several sides, the matrices are distinct from those for making regular forms where such can be thrust into and punched in a  
50 solid die box, and thence removed without difficulty. The ax poll furnishes a good illustration. A properly formed ax poll has swelled or convex sides and prior to my inventions as secured by Letters Patent grant-

ed to me on the first day of September, 1857, 55 and Letters Patent granted to me on the nineteenth day of July, 1859, it was deemed to be impracticable to make ax polls of such appropriate form by swaging dies. It is obvious that an ax poll with straight sides  
60 if such form were useful could be thrust into a solid die box and there punched but the swelled form is indispensable to a good ax poll and hence if the punching of the eye is to be performed subsequent to the  
65 formation of such an ax poll by matrices, it must be done in the same or similar or corresponding matrices.

*a a* are the forming matrices pivoted to the head block *b*, at *c, c*, and between these  
70 matrices is fixed a bed piece *d* which is embraced by the recessed ends of the matrices as they close upon the bar of metal used to form the ax poll. The cross head is made  
75 so as to slide up and down upon the upright guides *g, g*. The lower ends of the matrices *a, a*, move over inclined planes *h, h* on the pillow blocks, which cause the matrices to close upon the metal as the head block descends. 80

*m* is a punch fixed to the base block *n*, for punching out the eye of the ax poll while it is confined in the matrices, the punching being done while the closed matrices descend between the parallel sides of the pillow  
85 blocks.

The arms *s, s* attached to the matrices are furnished with projections or cam pieces *i*, which acting against the ridges *u, u*, on the pillow blocks draw the matrices apart as  
90 the head block rises.

The above illustrates the punching of swelled ax polls while in their matrices but the same principles of construction and operation will hold for other articles of irregu-  
95 lar forms which require to be punched.

What I claim as my improvement in the manufacture of axes of a swelled form is—

1. Punching the eyes of the same when inclosed in conforming dies made to open and  
100 close upon such swelled forms substantially in the manner herein set forth.

2. Combining the punch with said dies in the manner set forth.

LEVI DODGE.

Witnesses:

DAVID BLAKE,  
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