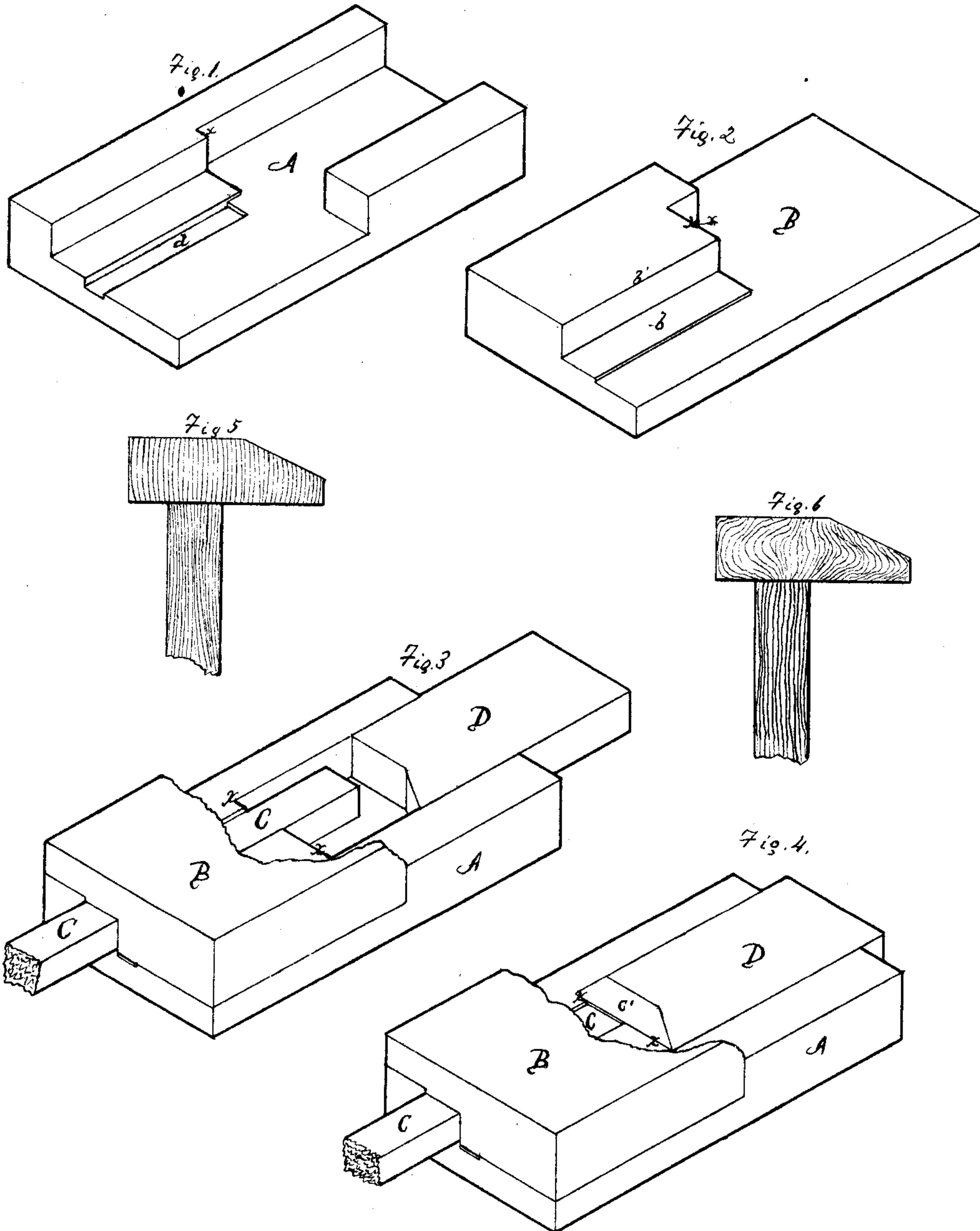


L. CHAPMAN.

Dies for Making Wrench-Heads.

No. 135,406.

Patented Feb. 4, 1873.



Witnesses.

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UNITED STATES PATENT OFFICE.

LUKE CHAPMAN, OF COLLINSVILLE, CONNECTICUT, ASSIGNOR TO THE
COLLINS COMPANY, OF SAME PLACE.

IMPROVEMENT IN DIES FOR MAKING WRENCH-HEADS.

Specification forming part of Letters Patent No. **135,406**, dated February 4, 1873.

To all whom it may concern:

Be it known that I, LUKE CHAPMAN, of Collinsville, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in the Manufacture of Wrench-Heads, of which the following is a specification, reference being had to the accompanying drawing, in which—

Figure 1 is an isometric view of the working-face of one of the dies used, hereinafter known as the die A. Fig. 2 is a similar view of the working-face of the other of the dies used, hereinafter known as the die B. Fig. 3 is an isometric view of the dies A and B put together for use, with a bar, C, upon the end of which a wrench-head is to be formed, in place, with the plunger D, which does the upsetting, in place, and having a part of the die B broken away so as to better expose the arrangement of the parts. Fig. 4 is a view precisely similar to Fig. 3, except that the plunger has moved down and formed the wrench-head. Fig. 5 is a side view of a wrench-head as formed by the old process of hand forging, the lines within the figure representing the lay of the fiber of the metal. Fig. 6 is a similar view of a wrench-head as formed by my dies and process, the lines within the figure representing the lay of the fiber of the metal.

The common method of forming these wrench-heads has been to take a bar of iron or steel of a width corresponding to the length of the wrench-head, and of a thickness corresponding to the thickness of the wrench-head, and then, by hand-forging and the aid of certain forming-tools, form the wrench-head, and draw down a part of the bar into the shape and size of the wrench-bar, this, of course, requiring skilled labor and considerable expense.

My invention consists in dies and process for forming a wrench-head upon a bar of the width and thickness of the wrench-bar, requiring only unskilled labor, and at a great reduction of cost, the product being a much superior article than that formed by the old process.

The letters A and B indicate the two dies used, the shape and contour of their faces being shown in Figs. 1 and 2. When these dies are placed together, as represented in Figs. 3 and 4, they admit into their embrace the bar C, which is of the width and thickness of the

wrench-bar, and projects far enough up into the die (see Fig. 4) beyond the shoulder *x* to furnish stock enough for the formation of the head. The dies A and B are secured in a proper machine, and are made at appropriate times to move up to and away from each other under power, as desired by the operator. The distance to which the bar C is inserted into the dies is indicated by a gage properly set, and its adjustment has to be determined by experiment—a thing easily done. The end of the bar C which is to be upset is heated to about a welding heat, so as to render it highly malleable and ductile. It is then inserted to the proper point between the dies, which are then allowed to grasp it under power. The plunger D then comes down under power upon the end of the bar, as shown in Fig. 4, which upsets and forms the wrench-head *c'*. The plunger then moves back, the dies separate, and the operator removes the bar with its formed wrench-head. On the face of the die B is a raised ridge, *b*, which, when the dies come together, presses against and somewhat into the side of the bar D, and thus avails to hold it firmly. In the face of the die A is a shallow groove, *a*, which catches any metal that may be clipped off the bar by the shoulder *b'* when the dies come together. I do not intend to have such clipping take place as a rule; but I have found that it will sometimes take place on account of the expansion of the bar by heat. When a head is formed by this process and these dies the fibers of the metal run continuously from the bar toward the ends of the head and then return, as shown in Fig. 6, while in a head formed by the old process the fibers of the metal in the head lie almost or quite parallel, so that the fibers which lie on either side of the wrench-bar end with the top and bottom of the head, as shown in Fig. 5; from which it is evident that my dies and process form a much stronger article than is formed by the old process. The lay of these fibers was found in both cases by biting the heads with acid.

It is not absolutely essential that the faces of the dies A and B should be constructed as shown in the drawing, for they will work if partible in almost any manner sidewise, and I have used them made partible in a variety of ways, but so far I prefer the construction shown;

and I intend my claim to cover all dies which are partible sidewise, and capable of the use described; this, of course, in combination with the plunger.

The partibility of the dies A and B, irrespective of the way or manner in which this partibility is effected, is one of the essential features of this invention, as by means of this partibility the bar to be upset can be readily introduced into the dies, the dies can thereby be made to grasp and hold the bar without other aid, and the bar after the head is formed can be readily and without difficulty taken out of the dies.

In practice I prefer the die A to be stationary, and the die B movable up to and away from the die A.

The machinery for operating these dies and plunger is not described, because I purpose to make such machinery the subject of other Letters Patent.

It is evident that if a wrench-head can be

swaged in this way between dies partible as described, that such a head can be swaged in a suitable cavity made in a die not partible, leaving the method by which such a swaging is removed from such a die out of the question. Such an invention was in fact made and used by me prior to the invention of these partible dies, and is not claimed herein, as I desire to make it the subject of other Letters Patent.

I claim as my invention—

1. The partible dies A and B, in combination with the plunger D, when constructed and designed for use substantially as described, for the purpose set forth.

2. The process of forming a head upon the end of a wrench-bar by means of the partible dies A and B and the plunger D, when operating substantially as described.

LUKE CHAPMAN.

Witnesses:

OLIVER F. PERRY,
EDWARD H. SEARS.