G. F. EVANS.

METHOD OF SHAPING AND FINISHING ARTICLES IN METAL.

No. 189,849. Patented April 24, 1877.

*Fig. 1.*

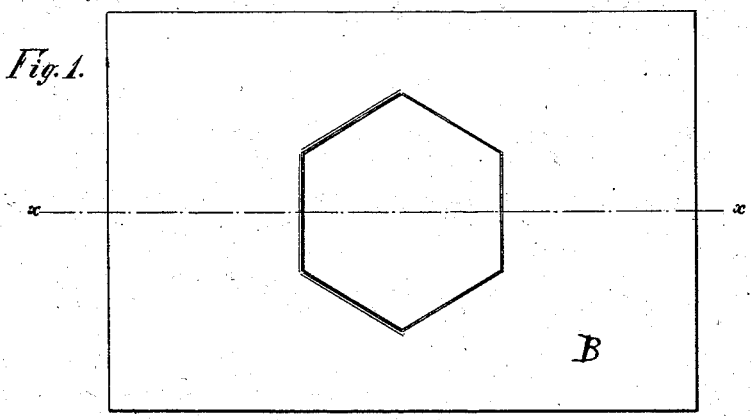



*Fig. 2.*

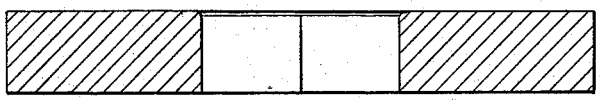



*Fig. 3.*

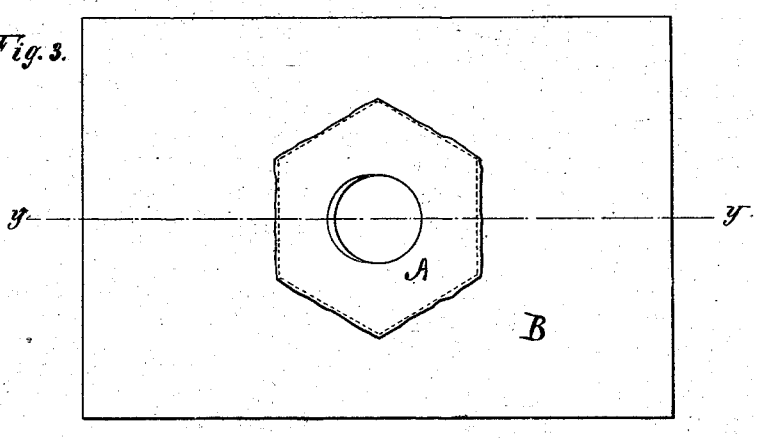
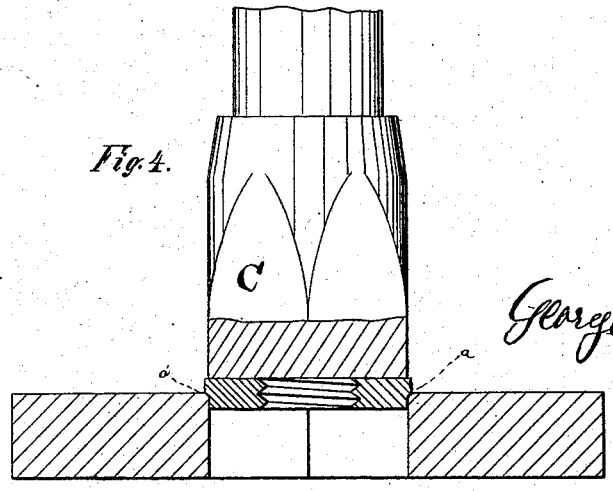



*Fig. 4.*




*Witnesses:*

Theodore G. Hoster.

C. H. Craw

*Inventor:*

George F. Evans.

# UNITED STATES PATENT OFFICE.

GEORGE F. EVANS, OF MECHANICS FALLS, MAINE.

## IMPROVEMENT IN METHODS OF SHAPING AND FINISHING ARTICLES IN METAL.

Specification forming part of Letters Patent No. **189,849**, dated April 24, 1877; application filed February 16, 1877.

*To all whom it may concern:*

Be it known that I, GEORGE F. EVANS, of Mechanics Falls, Poland, Androscoggin county, in the State of Maine, have invented a new and useful Method of Shaping and Finishing Articles in Metal, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

My invention relates to the shaping and finishing, in predetermined forms, articles of iron or other equivalent hard metal, by pushing the same cold into a die formed as hereafter described, whereby the article is formed to the shape of the die, and also by the compressing and polishing action upon the edges in contact with the female die, said edges are smoothed and polished, the surplus metal being removed in the operation, all as hereafter described.

It is a common mechanical operation to stamp out or cut into required shapes various articles of metal by means of a male and female die; but, in practicing this art, it is the custom to use a female die that has angular cutting-edges at its mouth, whereby the article formed is cut or sheared from its surrounding metal, and thus, if the article is one of any considerable thickness, leaving the metal at the line of severance rough and imperfect, making it necessary that the same should be finished by the use of the file or some equivalent instrumentality.

I have discovered that it is possible to impart a complete finish in the act of stamping out or fashioning the article by the dies even when the article has a considerable thickness, of, say, a half an inch or more.

While the method which I have found to be effectual in accomplishing this result is very simple, I believe it to be entirely new.

My method is practiced by the use of a female die in which the cutting sharp angular edges at its mouth are removed, so that the mouth flares somewhat with a convex curve.

As I do not intend to make any claim upon the dies which I employ, but only upon the method described of fashioning and finishing articles by their use, the accompanying drawings are designed chiefly to illustrate the said method. They serve also to enable any one skilled in the art to practice the method by constructing the required tools for the purpose.

Figure 1 is a face view of a female die designed for stamping out and finishing a six-sided nut. Fig. 2 is a vertical section of the same on line *x x*. Fig. 3 is also a face view of the same, showing a nut in process of being forced into the die. Fig. 4 is a vertical section on the line *y y*, Fig. 3, showing also the male die in position to force the nut into the female die. As will be observed, the edges of the female die, as seen plainly at *a a'*, are rounded off, so that they cannot produce any cutting effect upon the metal, the action being to crowd the metal into the die, thus partially compressing it, and to sever the surplus metal by pushing, pinching, or crowding it off, instead of cutting it off.

In practicing this method, I prefer to first cut or otherwise form the article to be operated on proximately into the designed form, but somewhat larger, as indicated by the full lines of A, Fig. 3. It is then placed directly upon the flaring curved mouth of the die B, which is a hardened block of metal. A male die or punch, C, which will fit closely into the straight part of the die B, is then brought down upon the article A with a blow or pressure that will force the article into the die B, when the effect will be to somewhat compress the metal of the article and crowd off the surplus metal, producing an article of the precise form of the die not only, but one whose edges are completely finished and even polished. The operation is to be performed with the metal cold.

I am, of course, aware that articles may, by the use of sharp-edged dies, be stamped or cut from comparatively thin sheet metal, with the edges sufficiently smooth and finished for many practical purposes. But this result cannot be effected by the use of sharp-edged dies upon metal beyond a certain thickness, and metal of the requisite thinness to enable such result to be so effected cannot be operated upon successfully by the curved mouthed die described, as it will be warped out of shape, and fail to take the form of the die; and so I find that when an article to be formed is so thick that it cannot be cut and finished by a sharp-edged die, it is thick enough to be

successfully formed and finished in a curved mouthed die by my method.

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

As an improvement in the art of shaping and finishing articles of iron and other hard metals, first reducing the metal approximately to the shape and size required, but somewhat larger, and then pushing or forcing the same while cold, by means of a closely-fitting punch, into a hole in a hardened block of metal, said hole being of the exact shape and dimensions required for the finished article, and the edge of whose walls are somewhat rounded at the entering side, in virtue of which the metal so operated on, instead of being drawn out or extended, will be condensed and smoothed, and the excess pinched or drawn off, substantially as set forth.

Witness my hand this 9th day of February, 1877.

GEORGE F. EVANS.

In presence of—
G. L. REED,
B. S. CLARK.