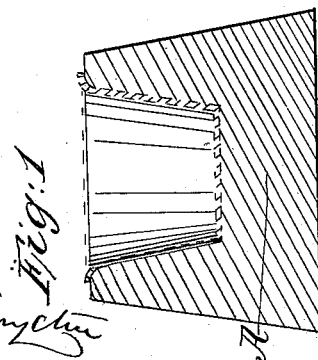
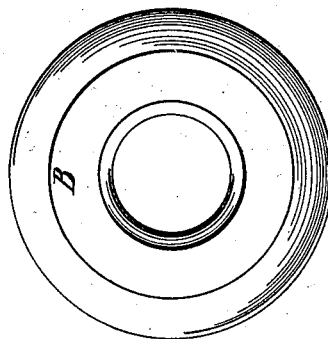
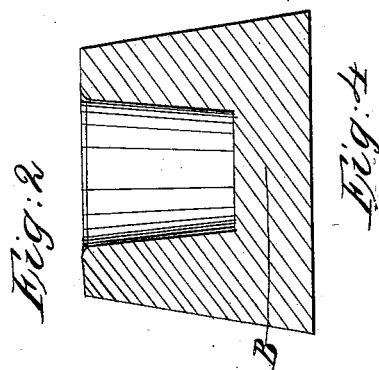
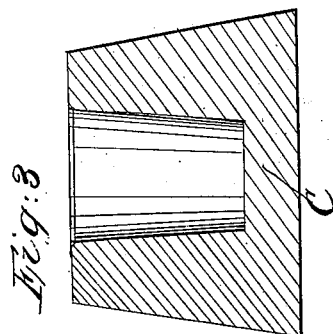


*M. Wells,*  
*Sheet-Metal Die.*  
*No 51,883. Patented Jan. 2, 1866.*



*Witnesses*  
*M. M. Loring*  
*Markus A. Hearn*

*Inventor*  
*Morris Wells*

# UNITED STATES PATENT OFFICE.

MORRIS WELLS, OF BROOKLYN, NEW YORK.

## DIES FOR THE MANUFACTURE OF SHEET-METAL WARE.

Specification forming part of Letters Patent No. 51,883, dated January 2, 1866.

*To all whom it may concern:*

Be it known that I, M. WELLS, of Brooklyn, E. D., in the county of Kings and State of New York, have invented a new and useful Improvement in the Manufacture of Seamless Hollow Sheet-Metal Ware; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figures 1, 2, and 3 represent transverse vertical sections of the dies which I use in carrying out my invention. Fig. 4 is a plan or top view of one of the same.

Similar letters of reference indicate corresponding parts.

The ordinary process of forming seamless hollow sheet-metal ware is by forcing the blank gradually down into a die of the proper form. When taken from this die the articles are rough and wrinkled, and they have to be placed on a chuck in a turning-lathe in order to make them smooth. During the process the metal has to be annealed several times to prevent it from cracking, and ordinary tinned sheet-iron could, therefore, not be used in the manufacture of such articles. The articles are first finished and then subjected to the tinning process. All these operations require great expense in time and labor, and on this account, and the high price of labor, all such seamless articles have heretofore been imported from foreign countries, particularly from France.

According to the improved process for manufacturing seamless hollow sheet-metal ware the blank is forced down into dies of gradually-increasing depth and decreasing diameter until the article finally assumes the proper shape, and by these means the articles are turned out smooth. No finishing operation in a turning-lathe is required, and ordinary tinned sheet-iron can be used in the operation. The cost of the articles thus made is thereby reduced

more than one-half, and articles of superior finish and smoothness are produced.

A represents the first die, which I place under the press described in my patent of November 15, 1864, or under any other suitable press, and by the action of the plunger the blank is forced down into the die instantaneously and without danger of cracking it, the form of the die being selected according to the strength of the sheet metal used. From the first die the article is brought in the second die, B, and finally it is finished in the last die, C. By the subsequent action of several dies the articles are turned out smooth and in such a state that they are fit for the market, and on account of the great reduction in labor thus effected in the manufacture of such articles I am enabled to sell the same at a greatly reduced price.

The superiority of my invention over such as are described in Letters Patent granted to F. J. Seymour, May 13, 1856, and to John Gray, May 5, 1863, consists in the use of successive dies which decrease in diameter as they increase in depth, whereas Seymour, Gray, and others use successive dies increasing both in diameter and depth. By the last-named plan the metal is rendered hard and brittle, the center of the sheet being struck up first and the outside being subjected to more and more strain. By my plan of using in succession smaller and smaller dies the metal is taken gradually from the outside, and it is not liable to split and crack.

I claim as new and desire to secure by Letters Patent—

The process hereinbefore described of forming seamless hollow ware by striking up the articles in a series of dies of successively increasing depth and decreasing diameter in the manner specified.

MORRIS WELLS.

Witnesses:

WM. F. MCNAMARA,  
J. P. HALL.