F. W. ARVINE.

Improvement in the Manufacture of Dies.

No. 124,414. Patented March 12, 1872.

Fig. 1

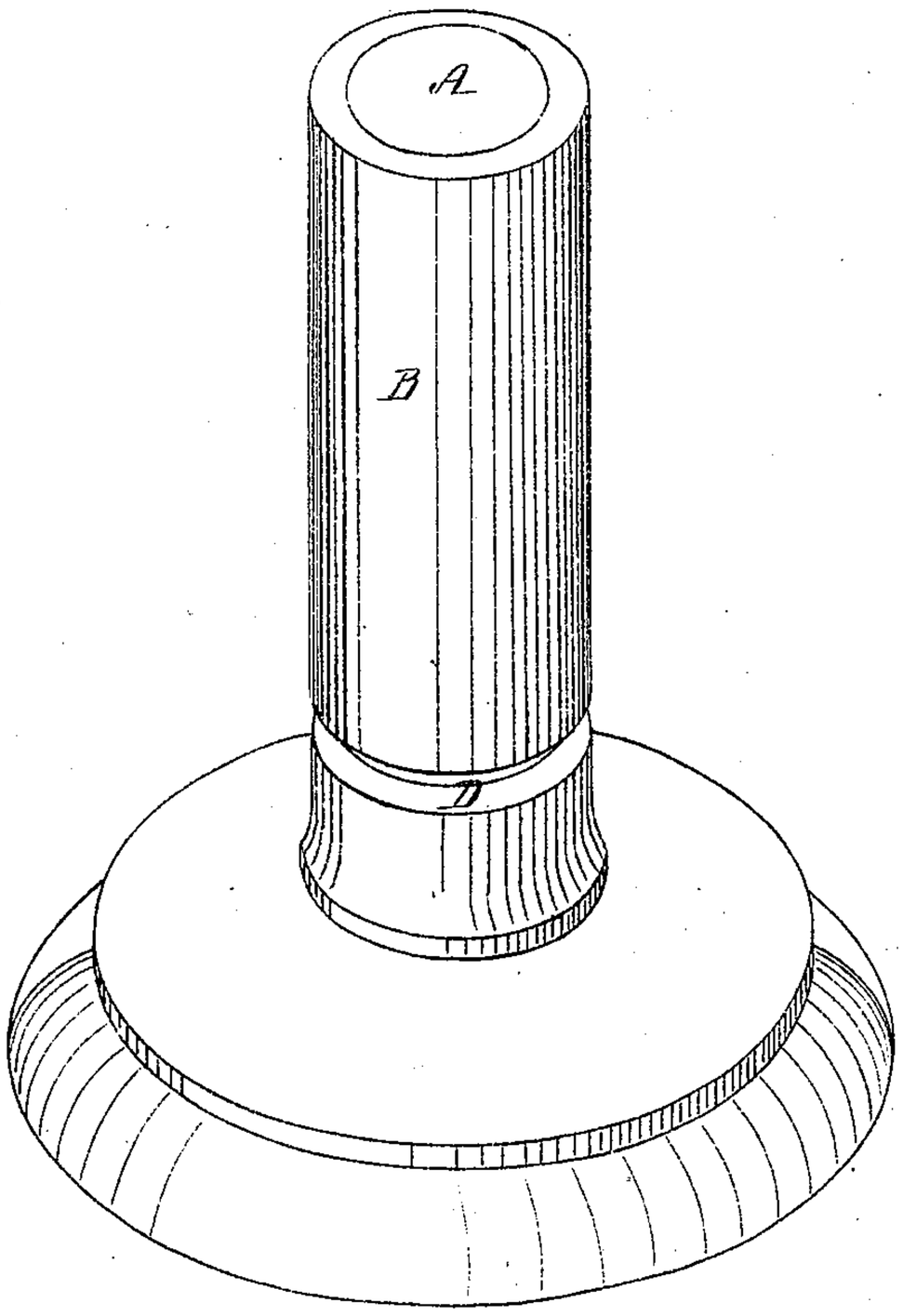


Fig. 2

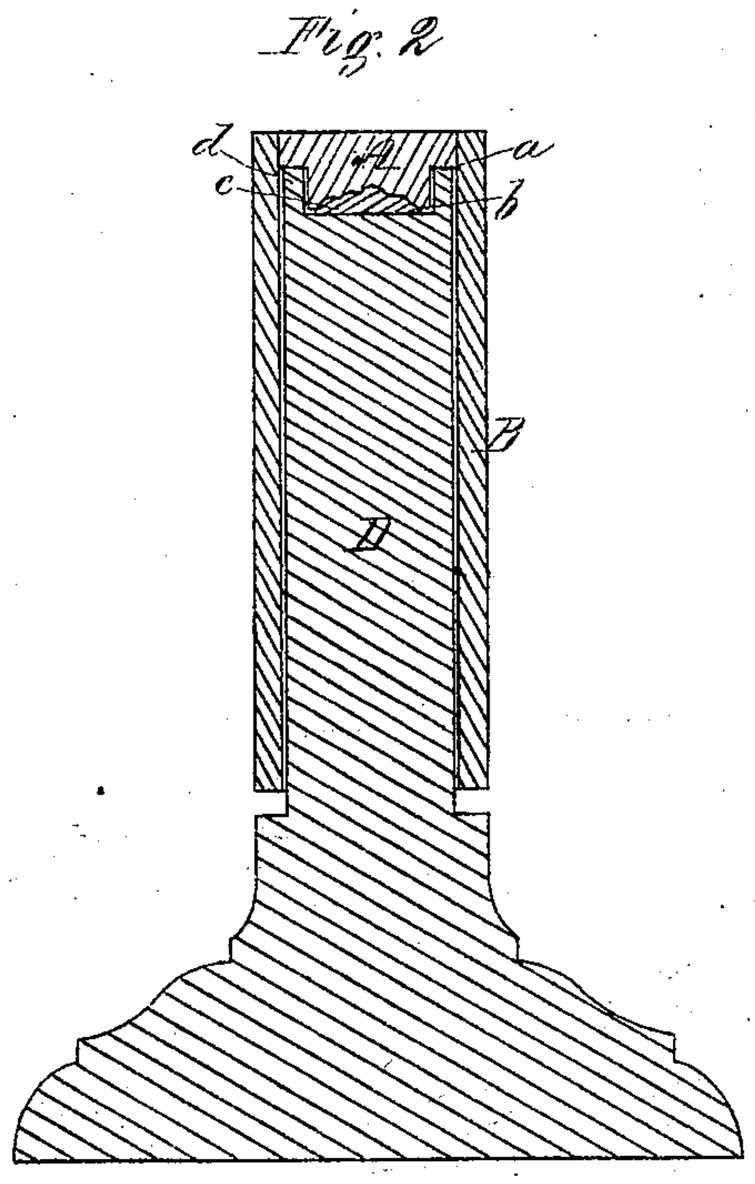


Fig. 3

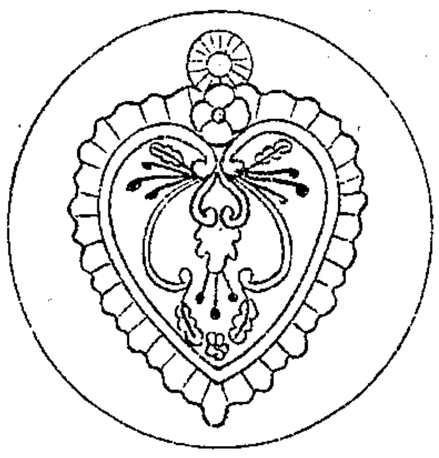


Fig. 4

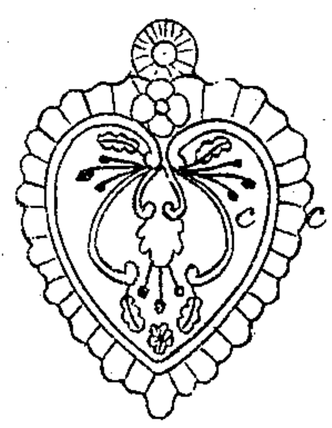
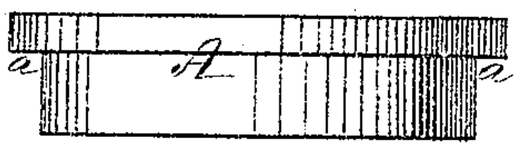


Fig. 5



D. F. Rockwell
F. W. Arvine

Friedrich, St. Arvine,

124,414

UNITED STATES PATENT OFFICE.

FREELING W. ARVINE, OF FAIR HAVEN, CONNECTICUT, ASSIGNOR TO GEORGE F. CHAMPNEY, OF TAUNTON, MASSACHUSETTS.

IMPROVEMENT IN THE MANUFACTURE OF DIES.

Specification forming part of Letters Patent No. 124,414, dated March 12, 1872.

To all whom it may concern:

Be it known that I, FREELING W. ARVINE, of Fair Haven, in the county of New Haven and State of Connecticut, have invented a new and Improved Process for Making Dies of Iron or Steel, of which the following is a full, clear, and exact description, reference being had to the accompany drawing making part of this specification, in which—

Figure 1 is a perspective view of the apparatus which I employ in my improved process for making dies. Fig. 2 is a vertical section through the center of the same. Fig. 3 is a plan of a die made in accordance with my invention. Fig. 4 is a plan of the "pattern" employed in making the die represented in Fig. 3. Fig. 5 is a side elevation of the steel block from which the die is made.

Steel dies have heretofore been made by cutting or engraving the device upon a steel block of the required size and shape. This operation, however, required the employment of skilled labor, and was exceedingly tedious; the time consumed in producing the die rendering it extremely expensive.

This invention has for its object to overcome these difficulties, and to enable me to produce a steel die without the necessity of cutting or engraving the device thereon; and consists in forcing the block which is to form the die, while in a highly heated state, into or over a metallic pattern, the form or design of which is thus transferred to the block, by which means I am enabled to readily produce a perfect die, in which the finest lines are clearly and sharply thrown out, with very little labor, and in a very short space of time, thus effecting a great saving in the cost of manufacturing steel dies.

To enable others skilled in the art to understand and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawing, A represents a disk or block of steel of the required size to form a die, and having a shoulder, *a*, formed thereon. This block is inserted into one end of a short metal tube, B, such as a piece of gas-pipe, the inside of the pipe having a slight coating of oil or grease. If the block A does not accurately fit the end of the tube, the joint may be luted with fire-clay or other suitable material to prevent the escape of the gas and smoke generated from the oil or grease on the inside of the pipe when the latter is heated, as will be hereafter described. A metal cap (not shown) is now fitted to the opposite end of the pipe to prevent the escape of the gas and smoke, after which the end of the pipe, with the block A therein, is placed in the fire and brought to an intense white heat, the steel block A being protected from cracking and injury by a coating of borax and fire-clay placed on its outer surface. This heating of the pipe, as above, causes smoke and gas to be generated from the oil on its inner surface, and this smoke and gas produces a slight film or coating on the inner side of the steel block A, which prevents the surface, so coated, from becoming oxidized by the heat to which it is subjected. As soon as the block A has been brought to a white heat, as above described, it is withdrawn from the fire and the cap removed from the lower end of the tube B, after which the tube is slipped over a vertical iron or steel mandrel, D, in a recess, *b*, at the top of which is placed the pattern or device *c*, the form of which it is intended to transfer to the under surface of the block A to produce the die. When a female die is to be made, the pattern will be in bas-relief, and for a male die, the pattern will be in intaglio. This pattern should be formed of copper or brass, or of some metal equally as hard. The block A now rests upon the pattern, and is then placed under a drop-press or hammer, the blow of which forces the steel block A down into or over the pattern *c*, as seen in Fig. 2, by which means an exact impression thereof is transferred to the steel block. One blow of the drop-press or hammer is sometimes sufficient, but several blows may be given if found necessary. The flange or rim *d*, at the top of the mandrel D, fits under the shoulder of the block A, and between the same and the pipe B, preventing the block A from spreading when being forced down by the blow of the drop-press or hammer. The tube B, with the die formed, as above described, is now removed from the mandrel D and plunged into cold water, after which the die is removed, and the required temper may afterward be imparted thereto, if necessary.

By the above-described process a perfect

die, in which the finest lines are clearly and sharply thrown out, can be readily and easily formed without cutting or engraving from a pattern, which can be made at a very small cost, and, as the inner surface of the steel block is protected from oxidization by the film or coating formed by the smoke and gas generated from the oil or grease, as above described, no scales are produced, and, consequently, no subsequent finishing by hand is required to complete the die. The device, which it is intended that the die should bear, can be first formed in wax, plaster, or wood, and an electrotype be taken from the same to be afterward filled with hard solder, when it may be used as a pattern, as above described. When the device is of high relief it is advisable, in making a female die, to partially countersink or excavate the steel block preparatory to commencing the operation.

Claim.

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

1. The within-described process of preventing oxidization of the die-block, and of making dies of steel, or iron and steel.

2. I also claim the mandrel D, in combination with the tube B, block A, and the pattern *c*, operating substantially in the manner and for the purpose set forth.

Witness my hand this 7th day of July, A. D. 1871.

FREELING W. ARVINE.

In presence of—
D. F. ROCKWELL,
E. P. ARVINE.