

(No Model.)

J. SCOTT.
METHOD OF MAKING DIES.

No. 428,961.

Patented May 27, 1890.

Fig. 1.

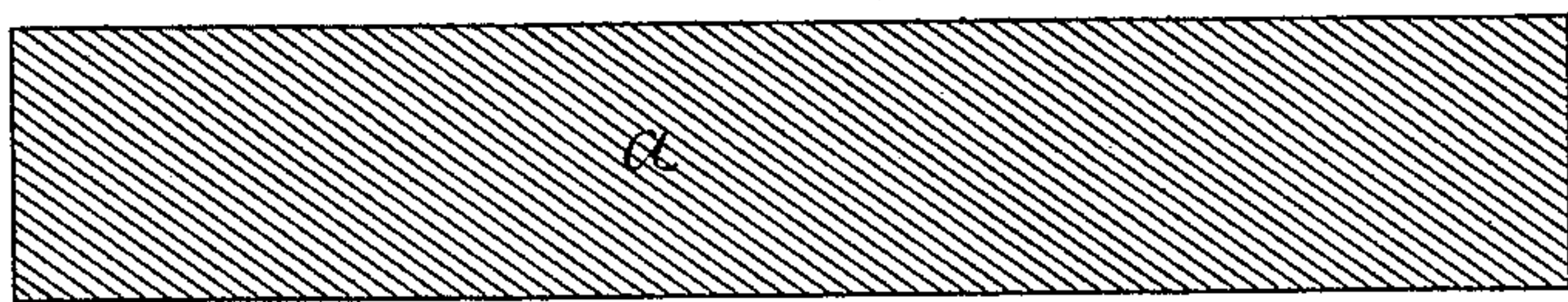


Fig. 2.

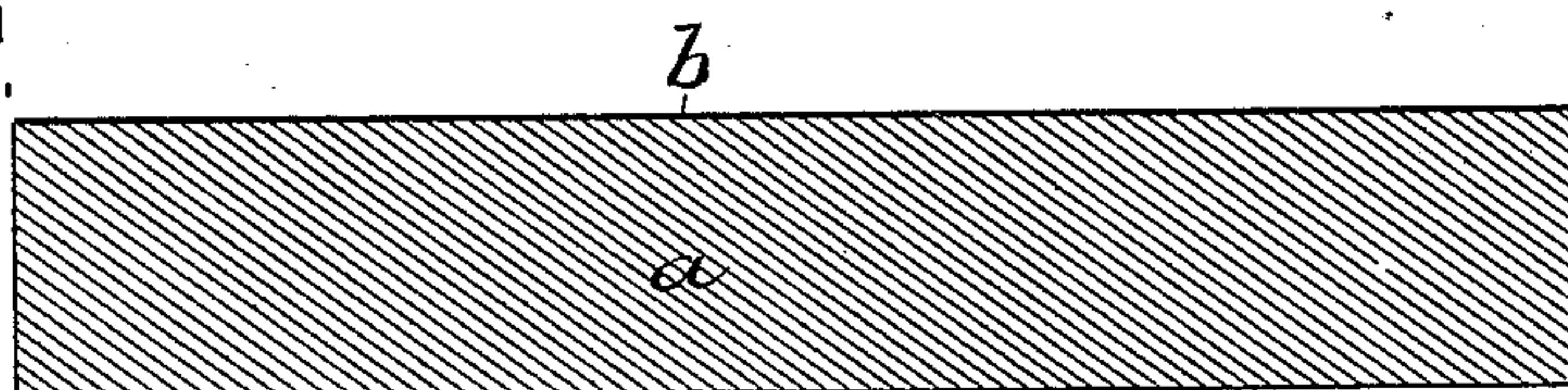


Fig. 3.

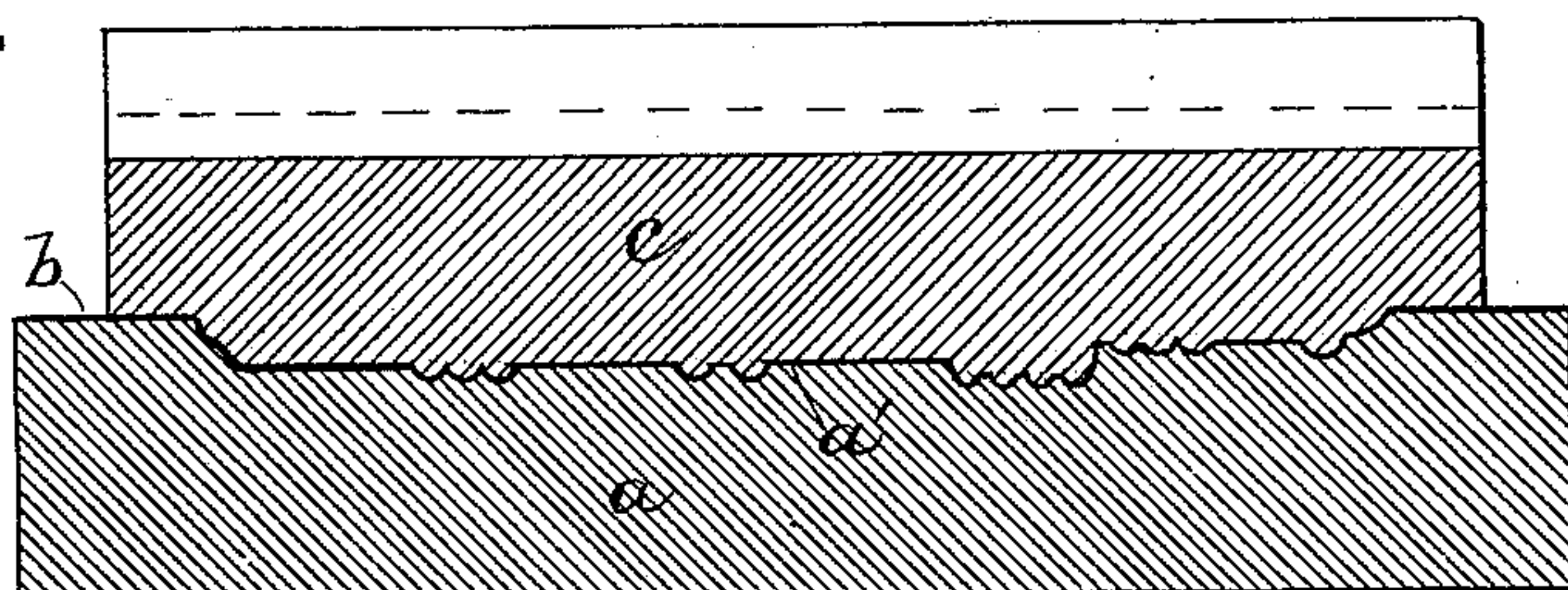


Fig. 4.

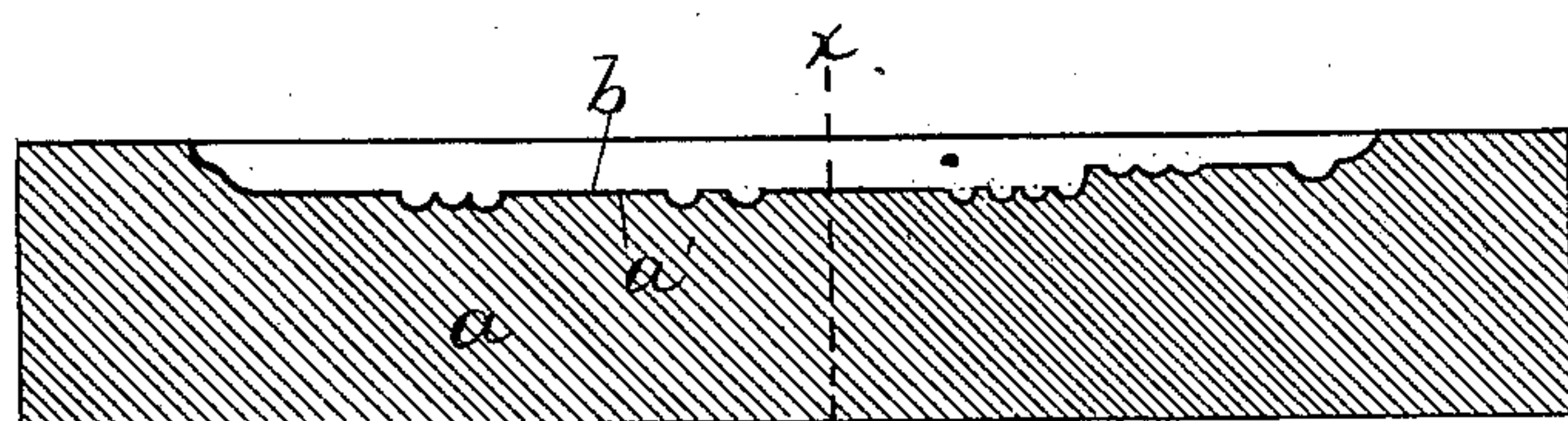
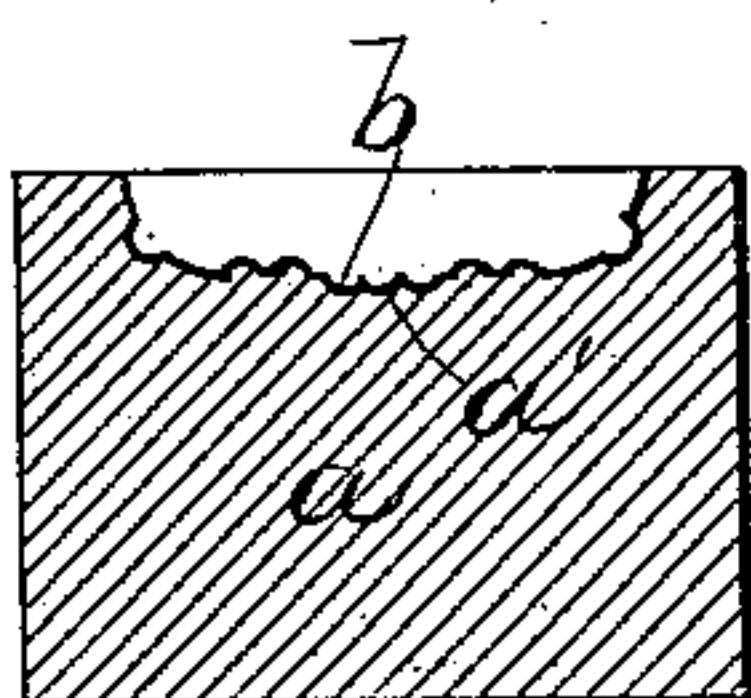


Fig. 5.



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JOHN SCOTT, OF TAUNTON, MASSACHUSETTS.

METHOD OF MAKING DIES.

SPECIFICATION forming part of Letters Patent No. 428,961, dated May 27, 1890.

Application filed December 23, 1889. Serial No. 334,688. (No model.)

To all whom it may concern:

Be it known that I, JOHN SCOTT, of Taunton, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in the Method of Making Dies for the Manufacture of Ornamented Metal Articles, of which the following is a specification.

This invention relates to the manufacture or duplication of dies which are used in making various articles of malleable metal—such as knife-handles—the dies being of hardened steel, in which the desired ornamentation is formed in intaglio, so that articles having ornamentation in relief may be formed by pressing suitable malleable metal into said dies. Dies of this class are made by cutting the desired intaglio ornamentation by hand in a block of steel, the cutting operation being very laborious and expensive. Owing to the expense of making dies of this class, it is very desirable to provide cheaper duplicates of each die, so that in the event of the injury or breakage of the original die a fac-simile thereof will be available, and in case the demand for the goods of the pattern for which the die was made is greater than can be supplied by one die any desired number of duplicate dies can be used simultaneously. The only method known of duplicating said dies is by making a reverse of the die by forcing a mass of soft steel into the original die, and subsequently hardening the same, the article thus produced being called a “hub,” and having ornamentation in relief upon its surface like that produced on the goods made by the die, and then forcing said hub into a block of red or white hot steel, thus forming in the latter a fac-simile of the acting surface of the die, the steel block being afterward hardened, as usual. A serious difficulty attends this method of duplication—viz., the oxidation of the ornamented surface of the duplicate by contact of air therewith while the metal is hot, said oxidation causing the formation of scale on the ornamented surface to such an extent as to seriously deface and injure the ornamentation.

My invention has for its object to prevent the formation of scale on the ornamented or acting surface of a duplicate die formed by pressing a hub into a block of heated steel;

and it consists in protecting the said surface by a coating or film of a suitable metal deposited by the process of electro-deposition, said coating being pressed into the block by the action of the hub and preventing the access of air to the die-surface formed on the block by the hub, as I will now proceed to describe.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a longitudinal section of the block of steel from which a duplicate die is to be made. Fig. 2 represents a similar section of said block, showing the electro-deposited coating on the surface in which the die is to be formed. Fig. 3 represents a longitudinal section showing the hub pressed into the coated surface of the block. Fig. 4 represents a longitudinal section of the block after the removal of the hub. Fig. 5 represents a section on line *x x*, Fig. 4.

The same letters of reference indicate the same parts in all of the figures.

In the drawings, *c* represents a hub, or, in other words, a block of steel that has been pressed into a die formed in the usual way with intaglio ornamentation, the metal of the hub being conformed by pressure to said ornamentation, so that it presents a surface having relief ornamentation. Said hub is made for the purpose of producing in a block *a* of hot steel a duplicate of the original die by the pressure of the acting surface of the hub into said block, a surface having intaglio or sunken ornamentation being thus formed in said block.

In carrying out my invention I deposit, by a suitable electroplating process, upon the surface of the block *a*, into which the hub is pressed, a coating *b* of cobalt, nickel, silver, or any other suitable metal capable of being deposited by electric action. Said coating adheres closely to the surface of the steel block, and is pressed into the block by the action of the hub, the acting or die surface *a'* of the block being formed through said coating, so that all parts of said die-surface are protected by the coating, as shown in Figs. 4 and 5.

The block *a* is heated to redness, or thereabout, when the hub is pressed into it, and if the coating *b* were not present the heated

die-surface α' would oxidize and scale would form thereon; but the firm and intimate union of the inoxidizable coating b with the die-surface prevents the access of air to the die-surface, so that there can be no oxidation of the steel surface, the latter being, therefore, entirely free from scale. The coating b should be extremely thin, and, in fact, a mere film, so that its interposition between the hub and the steel surface formed by the hub will not affect the ornamentation formed on the steel surface. The coating, being of comparatively soft metal, wears away when the die is used, its absence causing no appreciable change in the form of the die.

I do not limit myself to the formation of the coating b by electro-deposition, as a coating which I believe would be fairly useful may be formed by subjecting the block b to the action of a solution of sulphate of copper, thereby forming a thin film of copper on the surface of the block. Said solution may be applied by means of a brush; or the block may be placed with a quantity of small metal articles—such as tacks or rivets—in a tumbling box with a suitable quantity of the sulphate-of-copper solution, said box being rotated to cause the said small articles to repeatedly strike the surfaces of the block while the solution is in contact with said surfaces, the percussive action of said articles having the effect of hardening the film of copper that

forms on the surfaces of the block. I prefer the coating formed by electro-deposition, however, because of its firmer union with the surface of the block and the greater protection it affords said surface.

I claim—

1. In the method of making duplicate dies, which consists in impressing a hub the surface of which is the reverse of the original die into one of the surfaces of a block of heated steel and subsequently hardening said block, the improved step, which consists in protecting the steel surface to be impressed by a coating of a suitable metal, adapted to exclude air from the steel surface, as set forth.

2. The improved method of making duplicate dies hereinbefore described, the same consisting in depositing an electro-plate coating of metal upon the surface of a steel block, heating said block, and while it is hot impressing a male die or hub into the coated surface, and thereby forming a die-surface which is protected from oxidation by said coating, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 21st day of December, A. D. 1889.

JOHN SCOTT.

Witnesses:

C. F. BROWN,
W. C. RAMSAY.