

# United States Patent Office.

DAVID SCRYMGEOUR, OF FOXBOROUGH, MASSACHUSETTS.

Letters Patent No. 111,688, dated February 7, 1871.

## IMPROVEMENT IN ELECTROTYPE-DIES OR MOLDS FOR MOLDING PLASTIC MATERIALS.

The Schedule referred to in these Letters Patent and making part of the same.

*To all to whom these presents shall come:*

Be it known that I, DAVID SCRYMGEOUR, of Foxborough, in the county of Norfolk and State of Massachusetts, have made an invention of a new and useful Mode of Obtaining Electrotypes-Dies or Molds for producing articles of ornament or use from animal or vegetable pulp; and do hereby declare the following to be a full, clear, and exact description thereof.

My present invention bears intimate relations to an invention made by Francis Curtis of said Foxborough for producing articles of utility or ornament from pulp composed of animal or vegetable fiber, an application for a patent for which has been recently allowed by the United States Patent Office.

In order to carry out this invention of Curtis's it becomes necessary to procure a matrix which shall conform, in the most minute details, to the object of utility or art which it is intended to reproduce in large numbers, at low cost, from paper-pulp; and

My invention is intended to produce in an economical manner a mold or matrix for this purpose; and to this end I proceed substantially as follows:

First, I procure or fashion a model of a certain object of an artistic or useful nature, whether a picture-frame, an ornament for fine furniture, a molding, or any of the thousand-and-one subjects which come within the scope of the useful arts, such model or design being fashioned in wood, wax, gutta-percha, plaster of Paris, composition, or any material or substance which may be worked to the best advantage.

Having acquired a suitable model, I apply a film of wax to the blank or obverse side thereof, in order to obtain a convenient and inexpensive means of attaching it to a case or form of copper, this case or form serving to insure the correct position of the model in the electric bath in which it is immersed.

The case or form last named is produced from sheet-copper, and of a general outline to conform to the principal curvatures or boundaries of the model, and, when completed, is entirely incased in a thin jacket of wax. I now attach the model to this copper form by heating and fusing the wax upon the latter, and applying the base or back of the model to it, to which it will firmly adhere when the wax solidifies.

Having thus prepared and united the model and copper base, a suitable varnish is prepared by dissolving wax in naphtha, and a thin coat of such varnish is applied with a soft brush to the exterior or ornamental face or portions of the model which are not covered by wax, the nature of this varnish causing it to dry in a short time, while its consistency is or should be such that the lines, or irregularities, or tracery of the model, no matter how minute or finely cut, shall retain their primitive condition.

In pursuance of the objects of the invention, I next apply with a soft brush to the varnished exterior of the model a coating of finely-powdered plumbago, or

an equivalent substance, which will adhere thereto in sufficient quantity to cover all its irregularities or sinuosities, a certain degree of rubbing with a brush or other soft object being applied to produce a polished surface, the purpose of this dress of plumbago being in part to prevent adhesion of the copper deposit to the model, but mainly as a metallic vehicle whereby the copper in the bath is induced to creep on and over the model.

A ledge or inclosing-wall of wax should now be applied to the edge of the copper form or base, in order to prevent waste of copper in the electrotyping process to which it is subjected, and the whole immersed in the bath of an electric battery, the suitable connections being made, by which means a thin deposit of copper is, in a given time, laid upon the glazed surface of the model, the plumbago intervening.

When the copper has acquired the requisite degree of thickness, which will ordinarily result in from three to five days, the whole is to be removed from the bath and plunged in hot water, by which means the wax connection between the model and the copper form is sundered, and the two separated, the wax being in the act entirely cleaned from off both.

At this stage of procedure I remove the model from the copper shell which surrounds it, this removal of the model being effected in various ways, according to the nature of the material of which it is composed—if of wax, gutta-percha, or other easily fusible substance, by melting; if of plaster of Paris, &c., by breaking—thus leaving a thin and delicate negative mold or matrix of copper, which is a perfect *fac simile* of the original model, even to the most minute details.

I next apply to the interior or ornamental face of the matrix a glazing of any suitable substance, which shall protect it from the accidental adhesion of tin, of which a thin film is to be applied to the obverse or back side of the matrix by the ordinary electrotyping process, this film of tin being the medium whereby to subsequently solder the matrix to a suitable base or means of support.

Continuing this operation, I now procure a suitable vessel or flask of cast-iron, of such extent as to easily contain the mold, the interior of this flask being of a size and form to produce a plunger or tenon from a molten metal poured within it, which shall fit the socket of the hydraulic press, in which pressure is applied to the contents of the mold, a filling-orifice being made in the bottom of the flask, through which the molten metal is poured, as hereinafter explained.

At this stage, after procuring a flask, as above stated, I obtain a block or mass of wood, or a suitable soft and easily-carved or manipulated material, the outline of this block in horizontal section being equal to the horizontal area of the interior of the flask which it fills. I next carve or impress on the upper surface of this block a cavity or depression of a form and depth

corresponding to the exterior or obverse side of the copper mold, such mold being deposited in this cavity while the block rests upon the bottom of the flask, it being observed that the space intervening between the outer boundary of the mold and the inner wall of the flask is of a depth equal to the thickness of the wall of the metallic backing which we are now about to obtain, and which it is the object of this portion of the invention to produce.

Having thus deposited and supported the mold or matrix in the flask, I now throw into the flask and over the matrix a quantity of sand, and tamp it down in a compact and solid mass until the flask is filled, or substantially so. I now apply to the mouth of the flask a suitable plate or board, and invert the whole, which leaves the flask, with its contents, resting upon said plate. I now remove the flask, leaving the contents standing upon the plate, the block or support being uppermost, after which I remove the block carefully from off the copper matrix, which latter remains adhering to and resting upon the sand core, which has taken the impress of the matrix. From this point the completion of the operation is simple and easily understood: the flask, bottom up, is returned to place over and about the sand core and matrix, and firmly bolted to the plate upon which the latter rests, and a quantity of molten metal poured into the flask through the orifice in its bottom, such metal filling the flask and the space between its inner periphery and the exterior wall of the matrix which the removal of the block or core-box created. The metal, having become cool, is removed from the flask, the sand core cleaned from the matrix, and the latter, with such metal backing adhering to it, being in a state ready for use.

The pedestal or body of metal deposited about the exterior of the mold, as above stated, constitutes a solid and durable support or backing to the same, without which the mold, owing to its frail character, could not be successfully used.

The base of this backing or pedestal is, as before stated, of a size and form to fit the socket of the press in which the mold is used.

Any suitable substance, such as pulp from animal and vegetable fiber, forced into the matrix by hydraulic

or other pressure will assume the identical form and impress of the same.

I am aware of the existence of certain improvements in electrotypes for making imitation-straw goods, as shown in Letters Patent of the United States No. 61,074, in which is described a process somewhat analogous in principle, but totally different in detail from mine. In this patented process a flat plate of copper was employed, upon which the model in straw was secured; and, if this model was of a curved or irregular exterior, as, for instance, the rim of a hat, a small portion only of such exterior would touch the plate, generally, at but two isolated points. As the copper deposited by the electric battery upon the exterior of the mold can creep upon the same only at these two points, the process of depositing a copper shell of the requisite thickness was a matter of considerable time.

By the employment of a copper base, of a form to adapt itself to the curves or irregularities of the outline of some principal part of the model, I obtain a union of two large surfaces, by which the deposition of the copper upon the model is greatly hastened.

By the employment of the flask and core-box I obtain a very great advantage over the above-named patented process in producing the sand core or support for the matrix hereinbefore alluded to, since I am enabled to mold the shoulder of this core directly in consonance with the outline of the principal side of the model, which, in the case of a straw hat, is the under side of the rim, while in the patented process above named the requisite amount of metal is removed by the labor and expense of clipping and reducing with a chisel.

#### *Claim.*

I claim—

The mode herein described of producing a matrix or mold, and also a support or backing for the same.

DAVID SCRYMGEOUR.

Witnesses:

FRED. CURTIS,  
EDW. GRIFFITH.