No. 640,794. Patented Jan. 9, 1900.

J. L. McCAUL.

METHOD OF MAKING DIES FOR EMBOSSING LEATHER.

(Application filed Dec. 8, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

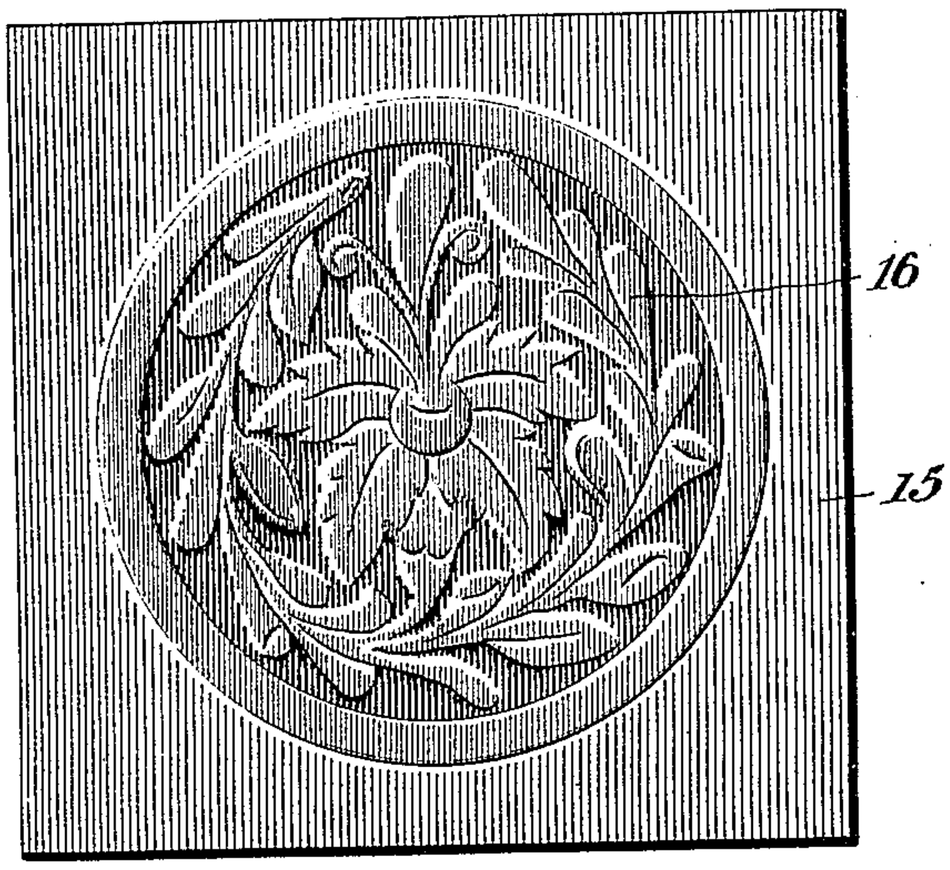

Fig 2.

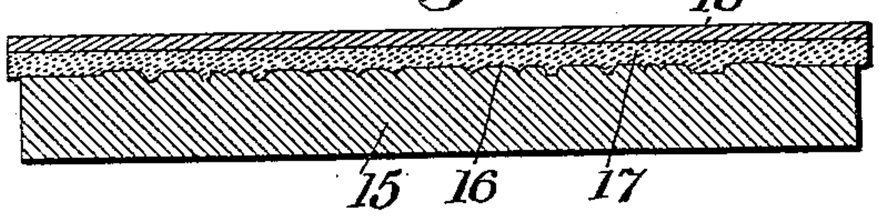

Fig. 3.

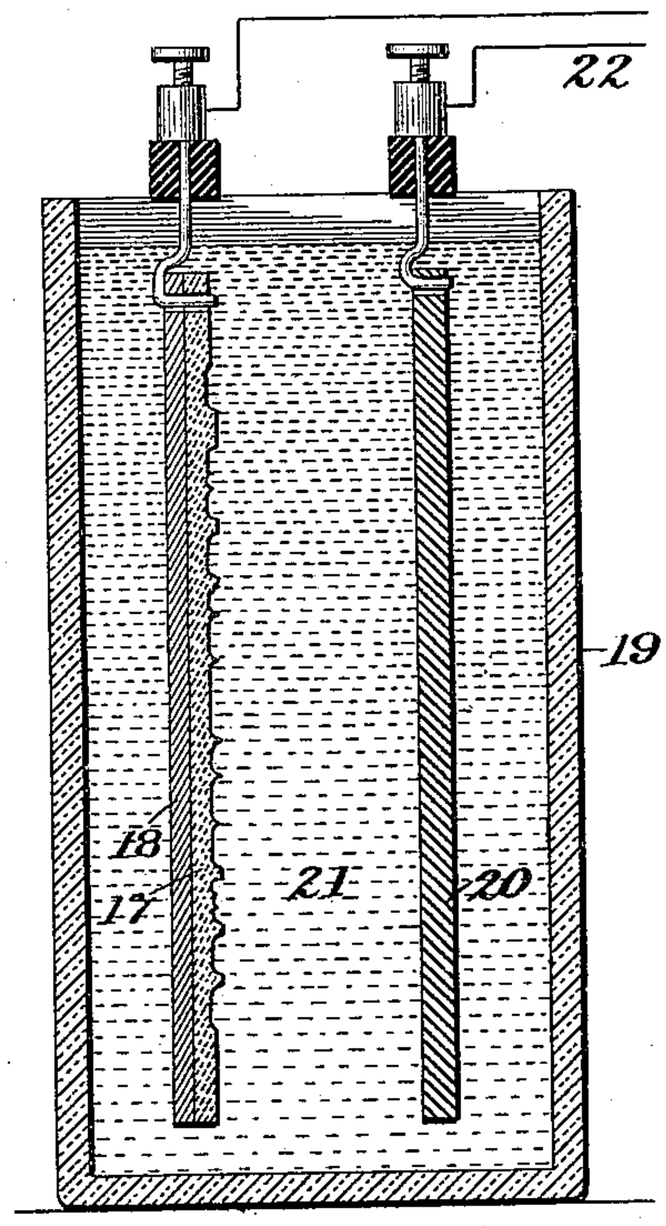

Fig. 4.

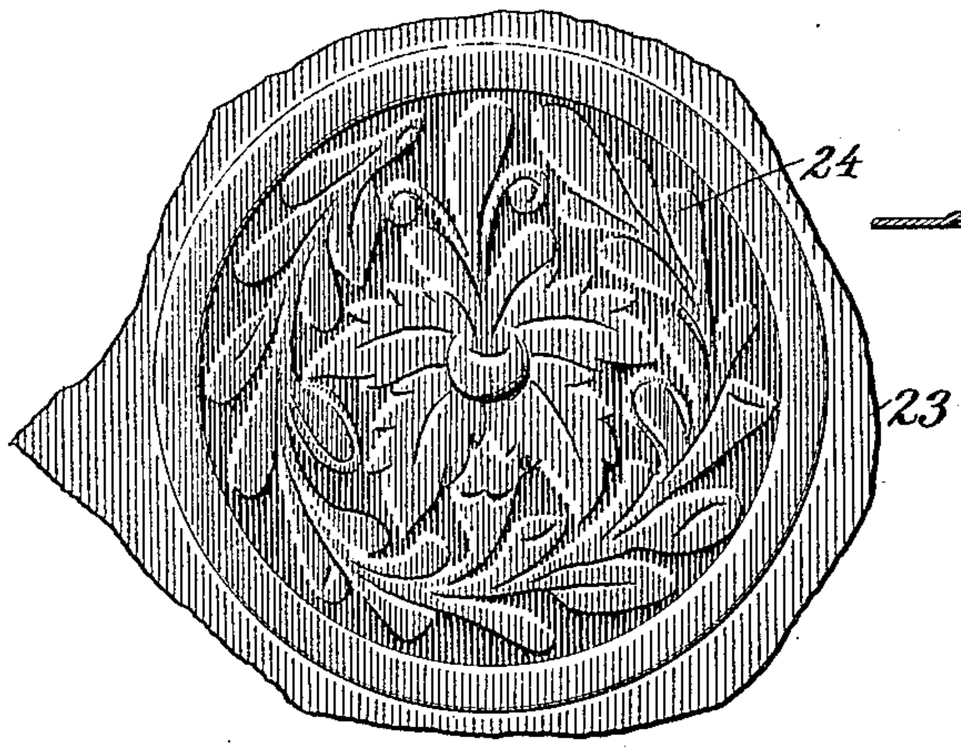

Fig. 5.

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No. 640,794. Patented Jan. 9, 1900.

J. L. McCAUL.

METHOD OF MAKING DIES FOR EMBOSSING LEATHER.

(Application filed Dec. 8, 1898.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 6.

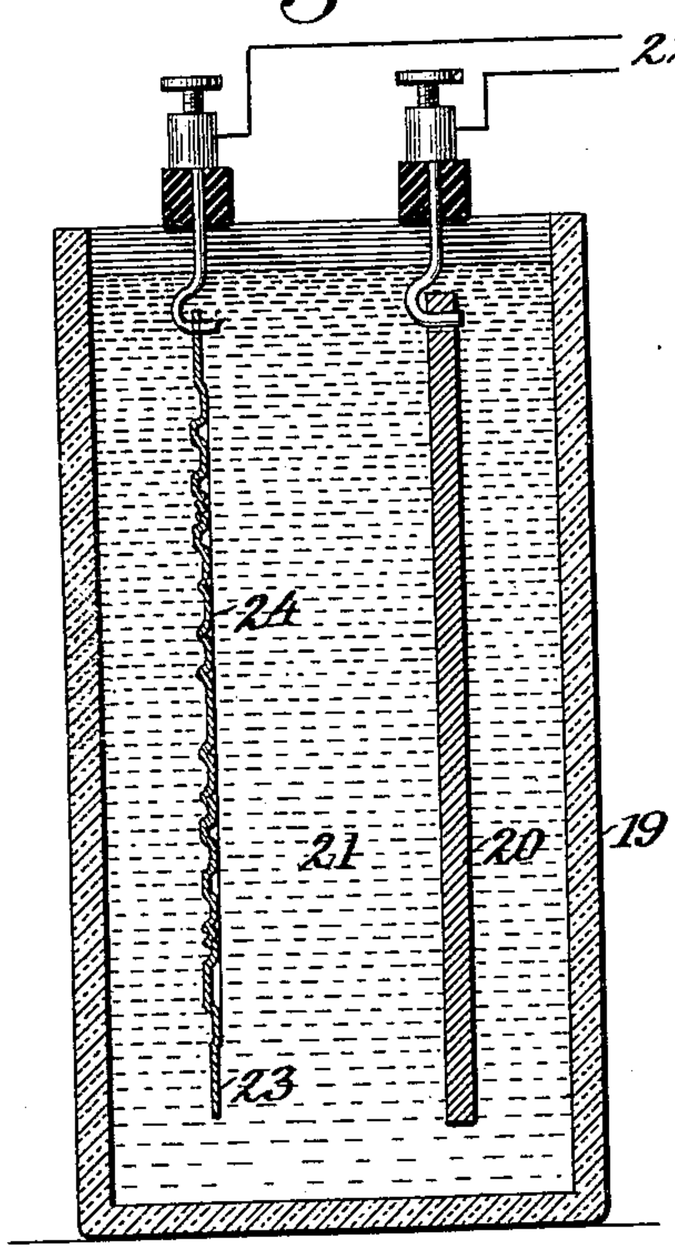


Fig. 7.

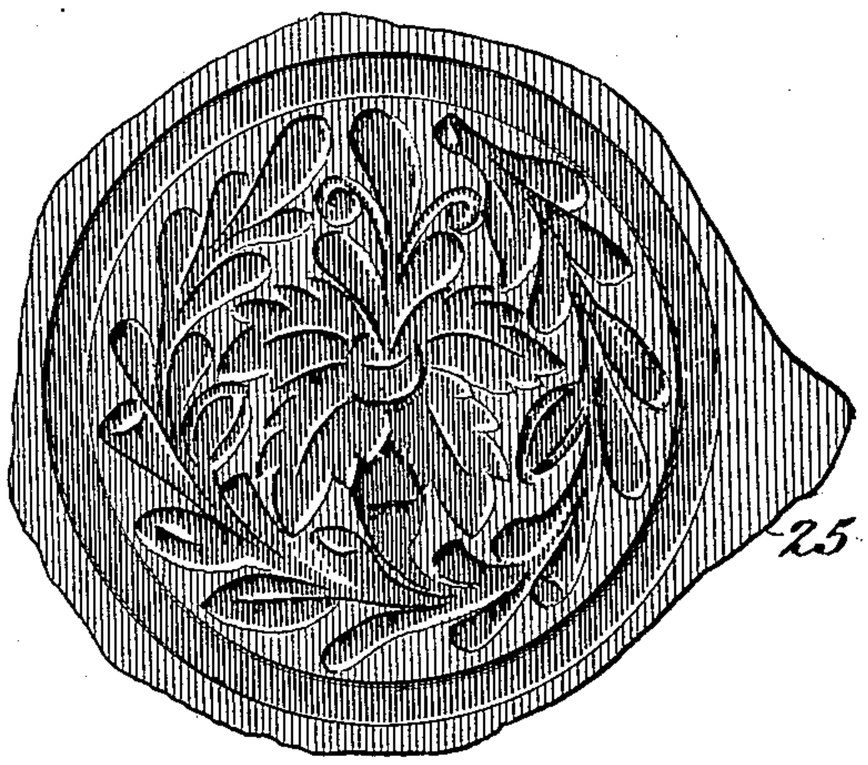


Fig. 8.

Fig. 9.

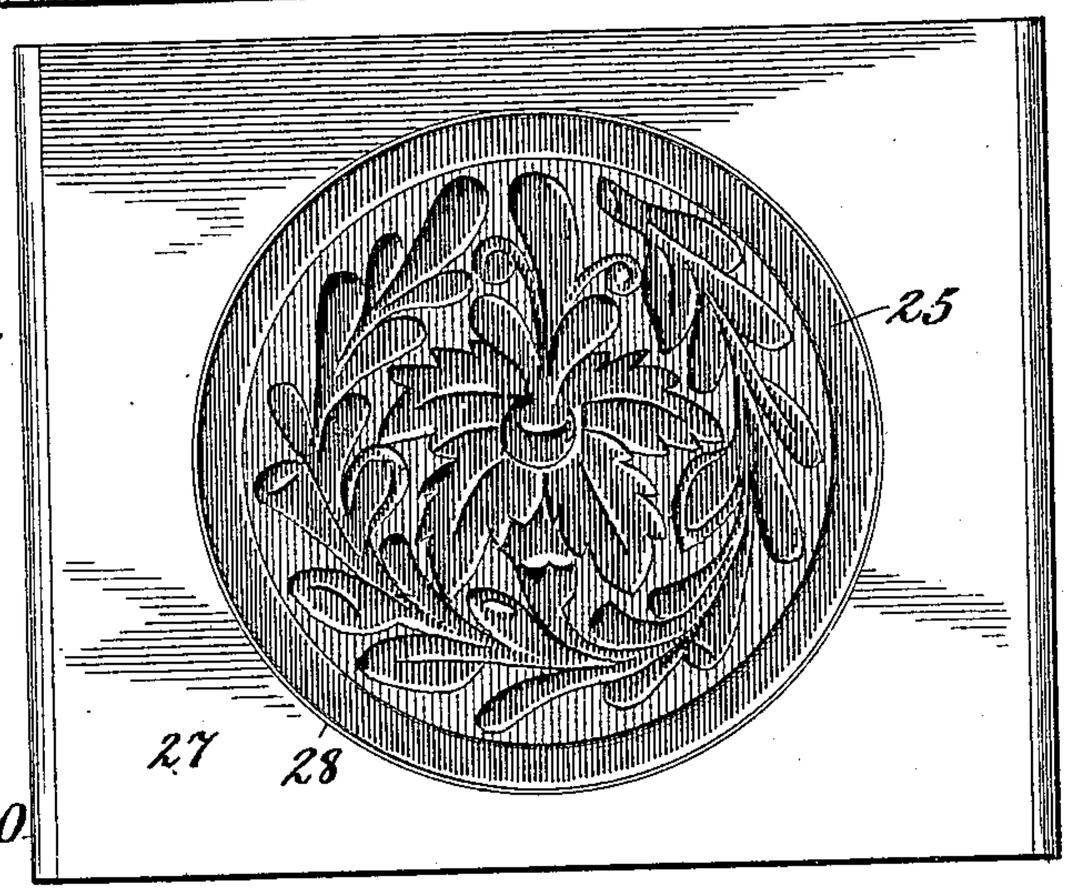
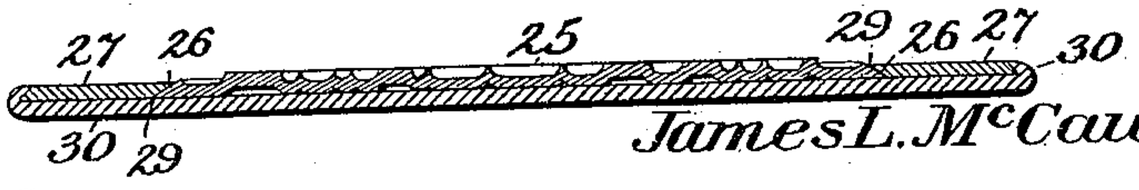


Fig. 10.



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UNITED STATES PATENT OFFICE.

JAMES L. McCAUL, OF KANSAS CITY, MISSOURI.

METHOD OF MAKING DIES FOR EMBOSSING LEATHER.

SPECIFICATION forming part of Letters Patent No. 640,794, dated January 9, 1900.

Application filed December 8, 1898. Serial No. 698,667. (No specimens.)

To all whom it may concern:

Be it known that I, JAMES L. McCAUL, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented a new and useful Method of Making Embossing-Dies by Electrolysis, of which the following is a specification.

My invention relates to a method of making dies especially designed for embossing leather and similar materials; and the object in view is to effect the expeditious and economical production of a die which will have its working face conform accurately to the contour of the ornamentation it is desired to produce in the work, including the outlines, the elevations and depressions, and the fine or shade lines which assist in giving an artistic and finished appearance to the work.

It will be understood that a die having any desired ornamental surface may be produced according to my invention; but in the drawings I will illustrate a die representing a flower and leaved sprays or branches around the flower. While such a die will be represented, it is to be distinctly understood that the pattern or figure is only emblematical of one of the many figures which may be employed, and hence I do not limit myself to any ornamentation which may be given to the face of the die produced in accordance with my invention.

In practicing the process I first proceed to prepare by hand a suitable pattern, which may be cut in a block of wood, metal, or other appropriate material, and from this pattern an impression is taken in a plastic sheet or layer of wax or equivalent material. If desired, the wax impression may be taken from a piece of ornamental work having the figure which it is desired to produce in the face of the die. The wax impression having been prepared, I then proceed to make a metallic patrix, which is effected by electrolysis, and this step in my process consists in suspending the wax impression in an electrolytic bath of sulfate of copper and sulfuric acid contiguous to a copper anode or plate also suspended in the bath. The bath being a part of an electric battery, the copper is deposited by electrolysis upon the intaglio face of the wax impression until the desired thickness of the copper-shell patrix shall have been attained, and the wax impression, with the adhering patrix, is then removed from the bath. The wax is now carefully removed from the metallic patrix, leaving a smooth finished surface on that side of the patrix next to the layer of wax impression.

The next step of the process consists in the formation of a metallic matrix or female die, which is effected as follows: The finished face of the metallic-shell patrix having been carefully cleaned, the patrix is suspended in the electrolytic bath contiguous to a copper anode or plate, and a current of electric energy having been turned on the copper is deposited by electrolysis upon the face of the finished face of the patrix to produce an intaglio-shell matrix the working face of which conforms in every detail to the finished face of the patrix. I now proceed to remove the patrix and the adhering matrix and carefully separate the two parts. I finally mount the intaglio die or matrix on a solid backing-plate, which adds stiffness and rigidity to the die to enable it to withstand the pressure to which it is exposed in the service of embossing leather for imparting an ornamental finished appearance thereto.

In order that others skilled in the art may understand my invention, I have illustrated by the accompanying drawings, forming a part of this specification, the appliances and the steps necessary to practice the process, in which—

Figure 1 is a plan view of the pattern. Fig. 2 is a sectional view of the pattern and a sheet or layer of impression-wax applied to the ornamental face of the pattern to produce in the wax an intaglio impression of the pattern-surface. Fig. 3 is a sectional elevation of an electric battery with the impression-wax suspended in the electrolyte thereof contiguous to an anode which is to be deposited by electrolysis upon the intaglio surface of the impression-wax for the formation of a metallic patrix. Figs. 4 and 5 are plan views of a cross-section of the metallic patrix separate from the impression-wax. Fig. 6 is a sectional view of the battery with the metallic patrix suspended therein contiguous to the anode for the formation on the smooth finished surface of the patrix of a metallic matrix. Figs.

7 and 8 are views in plan and section, respectively, of the matrix. Fig. 9 is a plan view of the complete die, and Fig. 10 is a sectional elevation of the die.

Like numerals of reference denote like and corresponding parts in each of the several figures of the drawings.

In practicing my invention I first prepare or select a pattern 15, having an ornamental face in rilievo. The pattern may have its rilievo surface prepared by hand or in any suitable way, and this pattern-surface may be on a block of wood, metal, or any other suitable material. In case it is desired to emboss leather in imitation of a selected figure which is in rilievo it is not necessary to prepare in wood or metal the pattern 15, and in this event an impression may be taken directly from the rilievo surface of the work which it is desired to reproduce in an embossing-die in accordance with the present invention. The pattern-surface having been prepared or selected as the occasion may require, I next proceed to take a wax impression from the rilievo pattern-surface. As represented by Fig. 2, a sheet or layer of wax 17 is spread or applied to uniform thickness over the rilievo surface of the pattern. If desired, the wax-impression layer or sheet 17 may be backed or reinforced by a metallic or other stiff backing 18, and the wax-impression sheet and the pattern-surface are carefully separated in order to prevent any tendency toward disfigurement of the intaglio impression which is taken from the rilievo surface of the pattern.

The next step in my process consists in preparing from the ornamental figure or pattern surface on the wax-impression sheet a metallic shell or patrix, and, as represented by Fig. 3, the prepared wax layer or sheet is suspended within an electric battery 19. This battery has an anode 20, which may consist of a copper plate, and this anode and the prepared wax-impression layer are suspended within an electrolytic bath 21 of the battery. This bath consists of a solution of sulfate of copper (blue vitriol) and sulfuric acid of 21° strength. The electric battery has the terminals of an electric circuit 22 connected with the anode and the cathode, the latter being formed in the present instance by the metallic-backed wax-impression layer, and the current is now turned on. A metallic film or shell is deposited by electrolysis upon the intaglio surface of the wax-impression layer or sheet in order to secure the formation of a shell or patrix 23. The wax-impression layer, with the patrix adhering to its intaglio surface, is now removed from the battery and the shell or patrix and the wax impression are separated or removed carefully. By this step in the process I prepare a metallic shell or patrix having a rilievo surface 24, which conforms accurately in every detail and line to the intaglio surface of the wax-impression sheet, and by depositing the copper or any other material upon the smooth intaglio face of the wax-impression layer the rilievo surface of the patrix presents a smooth finished surface when the wax impression is separated from the patrix.

The next step in the process consists in preparing the matrix from the rilievo surface of the patrix, and this is effected by suspending the patrix 23 within the electrolytic bath 21 of the battery 19 contiguous to the anode 20 therein, as represented by Fig. 6 of the drawings. The current of electric energy traversing the electrolytic bath deposits a film by electrolysis upon the rilievo surface 24 of the patrix 23, and this action is continued until the film or shell of the matrix 25 attains proper thickness, after which the patrix, with the matrix adhering thereto, is removed from the battery. If desired, the surface of the patrix may be coated with an exceedingly-thin film of a suitable material or substance which will prevent adhesion of the matrix to the rilievo surface of the patrix; but this is not strictly necessary. After the removal of the patrix, with its adhering matrix, from the bath the matrix is carefully separated from the patrix, and it will be found that the intaglio surface of the matrix presents a smooth finished appearance, conforming accurately in every detail to the rilievo surface of the patrix.

The final step in the process consists in mounting the matrix on a stiff backing. I prefer to employ a face-plate and backing-plate, as represented by Figs. 9 and 10 of the drawings. The matrix or shell 25 having been separated from the patrix and its surface cleaned, the matrix is preferably given a rounded or other form, and the edge of the matrix is beveled, as at 26. The face-plate 27 is provided with an opening of the size proper to receive the matrix 25, and the edge of this opening 28 is beveled, as at 29, to conform accurately to the beveled edge 26 of the matrix. The size of the opening in the face-plate and the bevels 26 29 of the matrix itself and the edge of the opening 28 of the face-plate are so proportioned and fashioned, so as to permit the intaglio surface of the matrix 25 to protrude beyond the exposed face of the plate 27. The matrix and face-plate having been properly assembled, I next proceed to apply a stiff and rigid backing-plate 30 to the matrix and the face-plate, and this backing-plate is secured firmly in any approved way to the face-plate—as, for instance, by riveting the parts together or upsetting the edges of the plates, as will be readily understood. The backing-plate 30 serves to confine the matrix firmly in place within the opening of the face-plate, and said backing-plate gives stiffness and rigidity to the die for the purpose of making the die withstand the pressure to which it is subjected when in service.

In using a die prepared in accordance with my invention the leather to be embossed is

placed against the intaglio surface of the matrix, and the work, with the die, is placed in a press or passed between rollers in order to subject the die and the work to sufficiently high pressure for the die to emboss the desired pattern or figure on one face of the work or leather.

Although I have described my process of producing a die as practiced for the formation of a flat patrix, I do not strictly confine myself to this particular adaptation of the invention, because I am aware that cylindrical or roller dies may be advantageously formed by proper adaptation of the invention to the particular end in view.

My invention enables the production of embossing-dies to be attained expeditiously and economically as compared with the common and well-known method of engraving or cutting the dies by hand. The pattern of the die may of course be of any desired configuration, according to the character of the ornamentation which it is desired to impart to the leather, and it will be equally evident that the die of my invention may be used in ornamenting leather for manufacture into harness, pocket-books, picture-frames, saddles, and any and all other articles of commerce which may be advantageously produced from ornamented leather.

What I claim is—

1. The process of making embossing-dies which consists, first, in producing a metallic patrix having a rilievo surface by electrodepositing a film on an intaglio surface of a suitable pattern; secondly, producing a matrix having an intaglio surface by electrodepositing a film on the rilievo surface of the patrix, and then separating the patrix and matrix one from the other, substantially as described.

2. The process of making a die for embossing leather and analogous substances which consists in the following steps, to wit: first, taking an impression in a wax sheet or layer from a pattern-surface of a figure it is desired to produce in the face of a die; second, producing a patrix by electrodepositing a metallic film on the intaglio surface of the wax impression; third, separating the patrix from the wax impression; fourth, producing a matrix by electrodepositing a metallic film on the rilievo surface of the patrix; fifth, separating the matrix from the patrix, and finally mounting the matrix on a rigid backing, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JAMES L. McCAUL.

Witnesses:
GEORGE R. THOMPSON,
E. P. PARDEE.