

(No Model.)

J. BAYNES.

METHOD OF ETCHING ON ONE OR BOTH SIDES.

No. 378,423.

Patented Feb. 28, 1888.

Fig. 1.

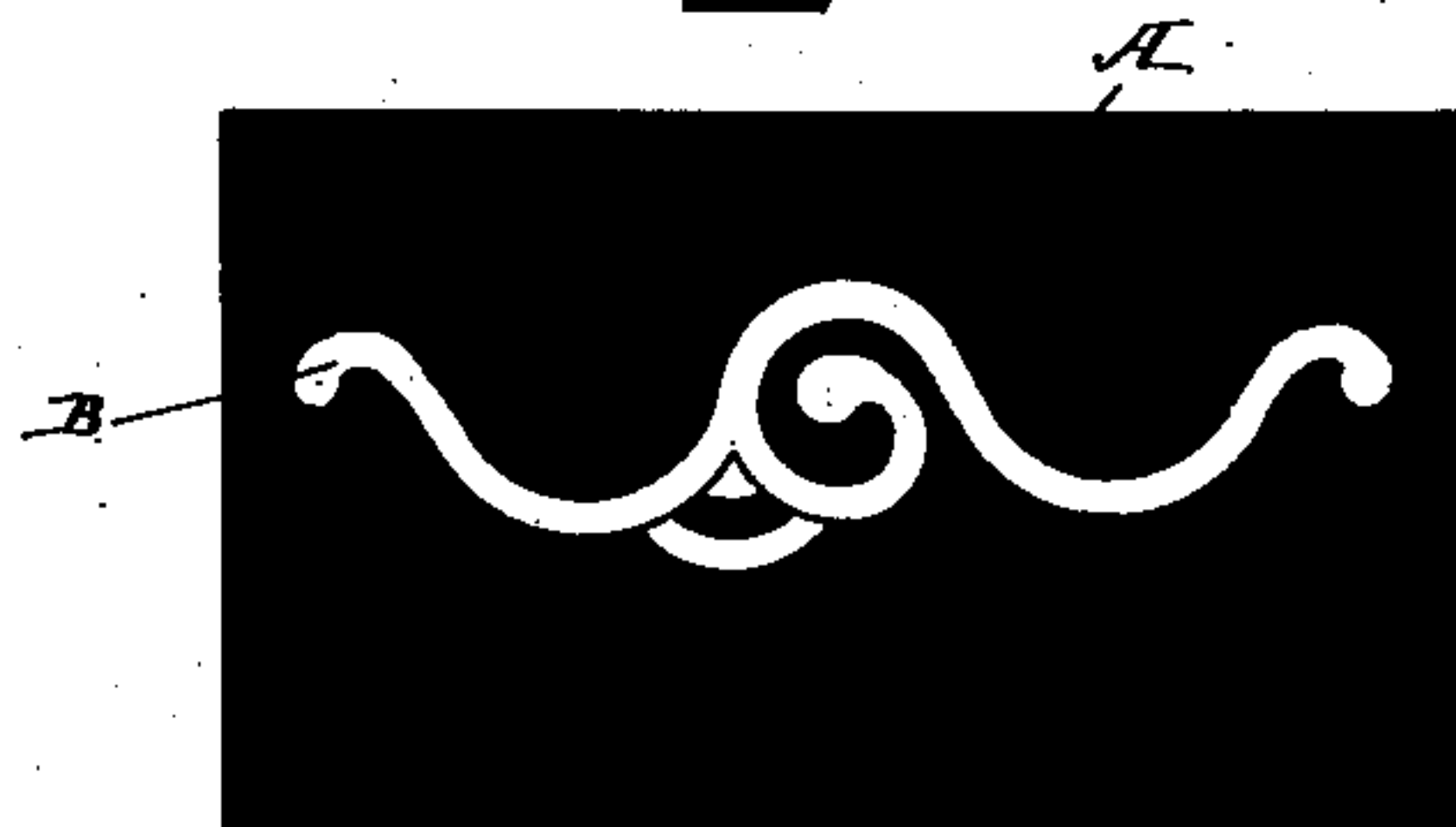


Fig. 2.



Fig. 3.

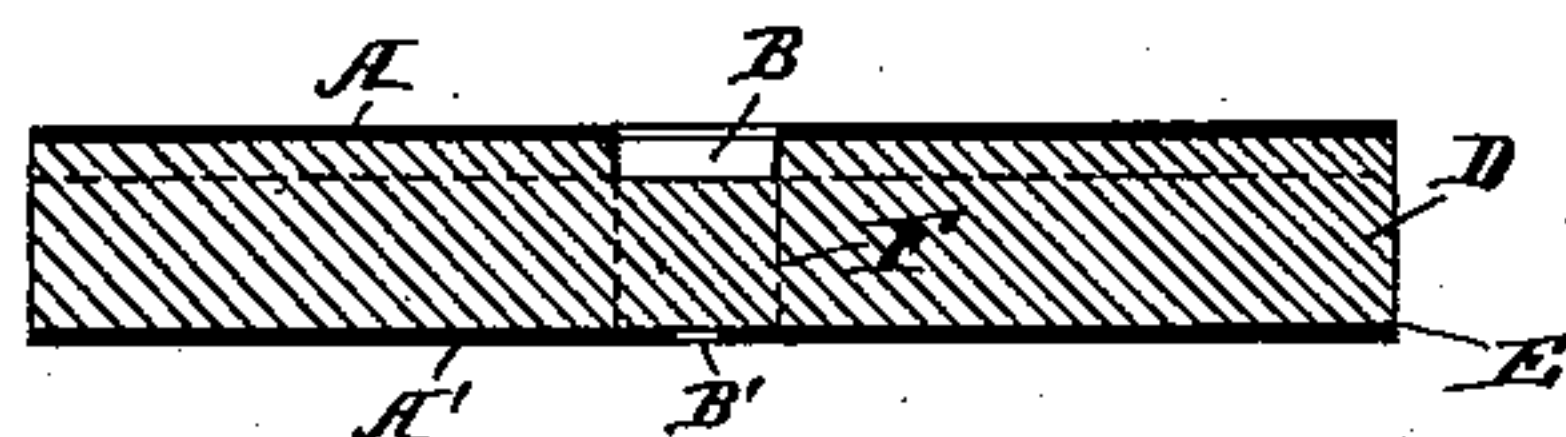


Fig. 4.

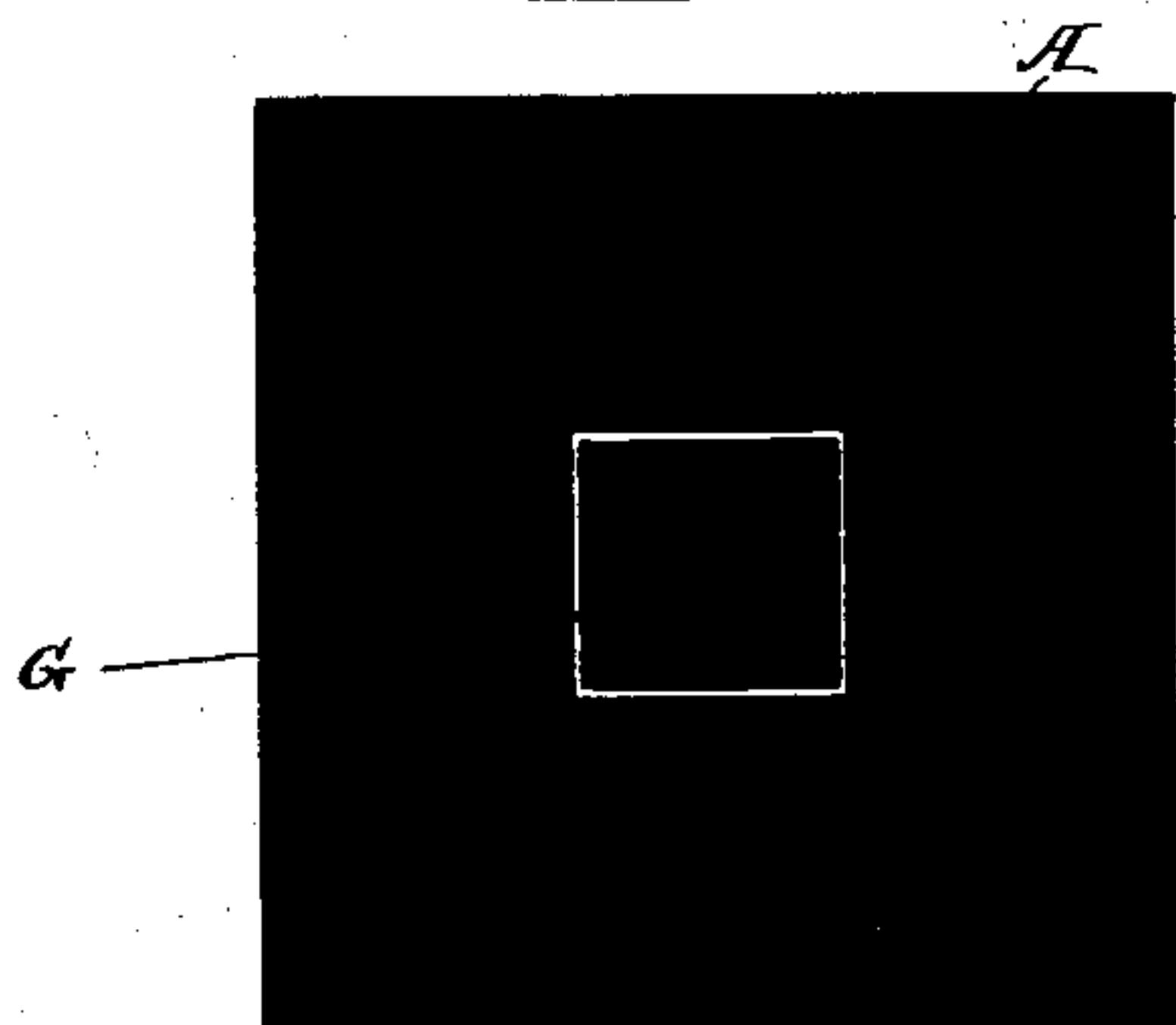
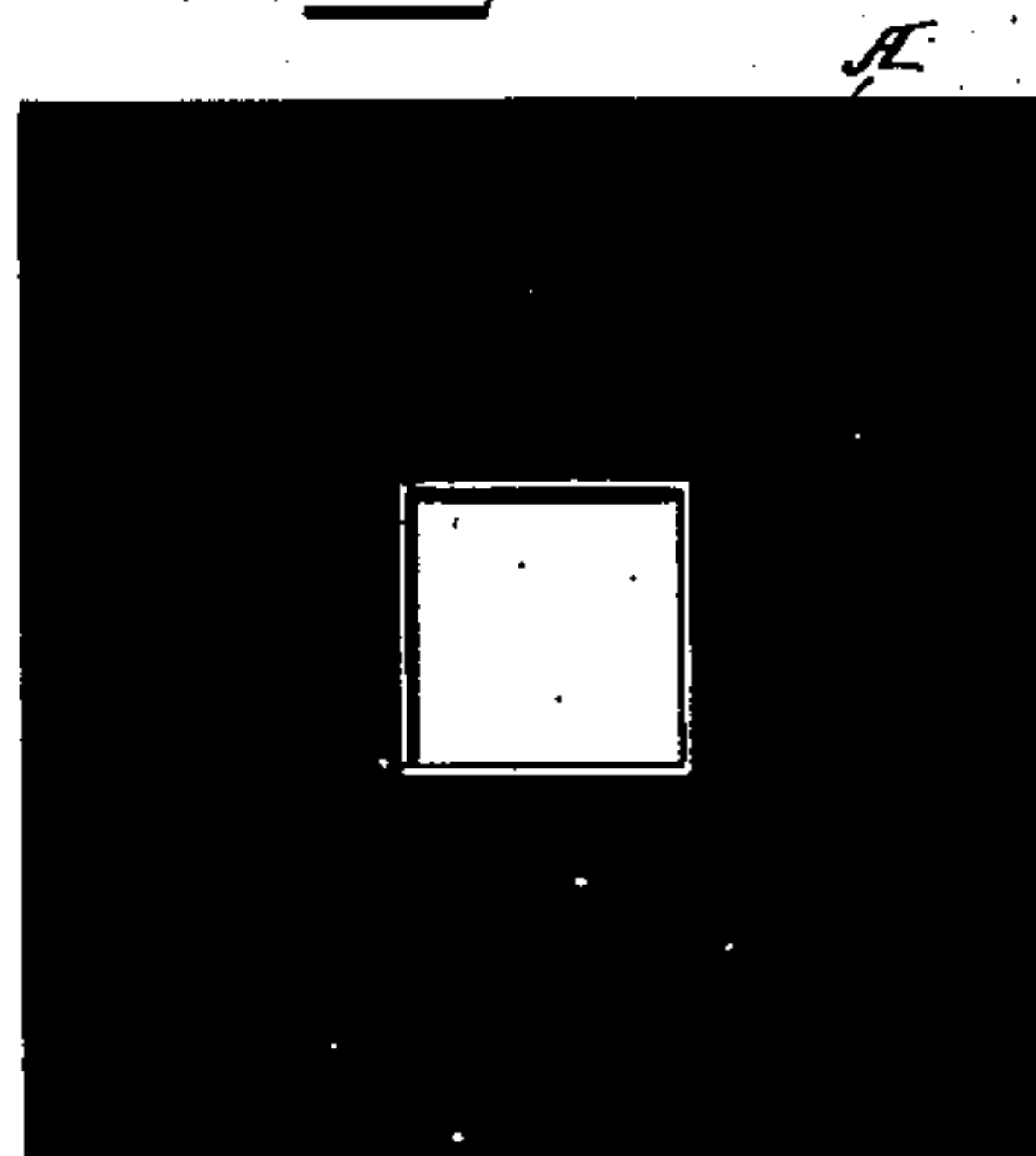


Fig. 5.



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UNITED STATES PATENT OFFICE.

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METHOD OF ETCHING ON ONE OR BOTH SIDES.

SPECIFICATION forming part of Letters Patent No. 378,423, dated February 28, 1888.

Application filed May 28, 1887. Serial No. 239,554. (No model.)

To all whom it may concern:

Be it known that I, JOHN BAYNES, a subject of the Queen of Great Britain, and a resident of Westchester county, in the State of New York, United States of America, have invented certain new and useful Improvements in Etching on One or Both Sides, of which the following is a specification.

My present invention relates to the ornamentation of metals, stone, marble, and the like, and more especially to a manner of ornamenting such articles by producing recesses or perforations therein.

The object of my present invention is to produce such ornamented articles in a cheap, simple, and effective manner.

When it is desired to perforate a comparatively thin plate of metal, marble, or other material, I have found that the same can be done by operating from one side only of the plate, and in doing this I prepare one surface of the plate for the reception of the pattern, which is applied in a coating of acid-resist, leaving the parts to be perforated free, so that the acid or other etching material may have access to the exposed parts. This resist-pattern may be applied in various ways, as by printing the same directly by the use of a lithographic press, or the resist-pattern may be transferred to the surface, or the surface may be completely covered with a resist made sensitive to light, and certain portions thereof rendered insoluble by the use of a proper negative in the ordinary photographic manner, and the soluble portions may be removed, leaving the acid-resist upon the surface in the desired configuration. This having been done, I coat the edges and back of the plate with the acid-resist and immerse the plate in a bath of etching material, or expose it to the fumes of an etching-acid, or otherwise produce the perforations in the parts not covered by the acid-resist. When, however, the plate is too thick to be properly treated by etching from one side, I cover both sides of the plate with the acid-resist, exposing only those parts wherein it is desired to form the perforations, and it is evident that the patterns on the opposite sides of the plate must be the reverse of each other in order that the parts to be perforated may cor-

respond and register with each other. These reverse patterns in the acid-resist may be applied in any of the ordinary ways, as by printing direct, transfer, or by photographing, as before stated; but I have generally found it most convenient to use the photographic process and to coat both sides of the plate with the sensitive acid-resist, when, by the use of a single pattern-plate, using it on the one side as a positive and on the other as a negative, the desired pattern may be correctly produced and registered in the acid-resist upon both sides of the plate, when the plate may be treated with etching material and etched from both sides toward the center.

If it is desired to produce the pattern partially of perforations through the plate and partially in recesses upon one side of the plate, it is obvious that the patterns in the acid-resist on each side of the plate should correspond in those parts which are to be perforated, and the parts which are to be in the form of recesses only are produced in the acid-resist upon only one side of the plate, when the plate being treated to the etching process the perforations will be made by etching on both sides of the plate and the recesses will be formed by etching on one side only. I have sometimes found it convenient, in producing these perforations and recesses, to make a single negative corresponding to all the portions to be etched, and from this negative to produce the pattern in the acid-resist upon one side of the plate and then to produce a similar but reverse pattern in the acid-resist upon the other side of the plate, and subsequently to stop out with a brush or otherwise the parts of the pattern which correspond with the recess portions of the pattern only.

It is well known in etching perforations through a plate that the area of the perforations will not be the same throughout the whole thickness of the plate, as some portions—as those next to the surface—are exposed a longer time to the action of the etching material, and they will consequently be eaten away to a greater extent, leaving the perforations tapering to some extent. In order that the perforations may be of the same diameter on both sides of the plate, the pattern has to be pro-

portioned accordingly—that is to say, the openings on one side where they are to be etched to the lesser depth are larger than the openings on the side where the greater depth is to be etched.

When the plate is of considerable thickness and it is desired to have the perforations of a substantially uniform cross-section throughout the thickness, and to preserve the face of the metal sharp, and to prevent further side action upon the surface, I have found it advantageous to first cover the plate with the acid-resist material in all portions except those corresponding to the outlines of the perforations, and to treat the plate to an etching process to eat in to the required depth the lines corresponding to the outlines of the perforations. These lines can then be filled with some acid-resist which is insoluble in the same material as the acid-resist afterward applied to the parts to be protected, and which conform to the pattern to be produced, and it is then evident that the edges of the openings will be protected by this insoluble resist, and the perforations will be produced with substantially the same cross-section throughout.

In the drawings, Figure 1 shows a plate coated with a resist, leaving the parts exposed which are to be perforated. Fig. 2 shows a plate coated with a resist, leaving the parts exposed which are to be perforated, as well as those which are to be in the form of recesses only, these parts being indicated by the shaded portions of the pattern, and it is understood that the opposite side of the plate is coated with a resist, leaving the parts exposed corresponding to the parts that are to be perforated only. Fig. 3 is a cross-section of a plate, showing the manner of etching from both sides of the plate, but to different depths; and Figs. 4 and 5 show a plate in which the outline of the perforations is first etched and stopped out with an acid-resist material.

Referring to Fig. 1, the plate is shown as covered with an acid-resist, A, leaving the portions B of the plate which are to be perforated uncovered, and, as before stated, this pattern may be applied by printing directly the pattern thereon in the resist material, or by transferring it thereto in the ordinary manner, or by first covering the whole plate with the sensitive resist and producing the pattern thereon by exposing the resist to light behind a negative plate containing a pattern corresponding to the parts to be perforated, and afterward washing each or otherwise removing the un-solidified parts of the resist.

The pattern shown in Fig. 2 may be produced by any of these processes, and two separate patterns may be employed, one corresponding to the portions B, which are to be perforated and which are produced upon both sides of the plate, but in reversed order, and the other pattern corresponding to the parts C, which are to be recessed and which are produced upon only one side of the plate; but I

have found it more convenient and cheaper, as a general thing, to produce a single pattern-plate embodying both the portions to be perforated and recessed and to produce a pattern in the acid-resist from this on both sides of the plate and to afterward stop out or paint out on one side the portions C, which are to be recessed upon the other side.

When it is desired to etch the holes to a greater depth on one side than on the other, the acid-resist A upon one side of the plate, as D, Fig. 3, is applied so as to leave the exposed parts B of substantially the size it is desired the perforations to be produced, while the resist A' on the other side, E, of the plate is applied so that the portions B', which are to be etched are smaller than the corresponding spaces B, and as the acid eats away not only the bottom of the perforations but the sides thereof, the final result will be a perforation of substantially uniform cross-section, as indicated in the dotted lines F. In the above case, however, it is not possible to produce the perforations with perfectly uniform cross-section, especially if the plate operated upon is thick, and in that case I first, preferably, cover the whole plate with the acid-resist A, except the outlines G of the perforation, and I then proceed to etch these outlines to the required depth when the outlines are to be filled with some other acid-resist—as sealing-wax—which is not soluble in the same materials as the acid-resist A, which is afterward applied to the parts to be protected, and which resist is preferably an asphaltum resist of the ordinary kind.

It will thus be seen that when the plate is exposed to the etching process the wax resist in the outlines G of the perforations will prevent the sidewise or widening effect of the etching, and the perforations will be practically the same configuration throughout, and the wax resist can be afterward removed by dissolving it in any proper solvent or by mechanical means.

What I claim is—

1. The process, substantially as hereinbefore set forth, of ornamenting plates, which consists in covering both sides of the plate with an acid-resist, in leaving the parts to be perforated exposed on both sides and the parts to be recessed exposed on one side only, and then subjecting the plate to the etching process.

2. The process, substantially as hereinbefore set forth, of ornamenting plates, which consists in coating both sides of the plate with an acid-resist, the parts of the plate to be perforated being exposed, the exposed parts on one side being proportionately smaller than the corresponding parts on the other side, whereby when the plate is etched to different depths upon each side the perforations will be practically of a uniform cross-section.

3. The process, substantially as hereinbefore set forth, of ornamenting plates, which

consists in covering the plate with an acid-resist at all portions except the outlines of the part to be perforated, etching said outlines, filling said outlines with a resist not affected
5 by the solvents of the first resist, producing the pattern thereon, and subjecting the same to the etching process.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN BAYNES.

Witnesses:

BERNARD J. KELLY,
P. KEMBLE, Jr.