

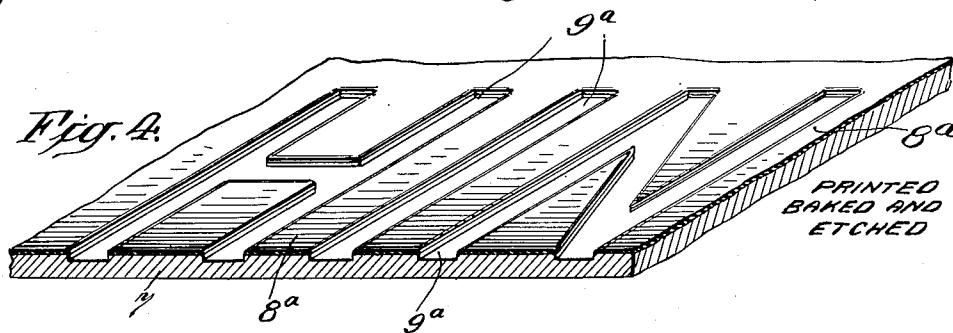
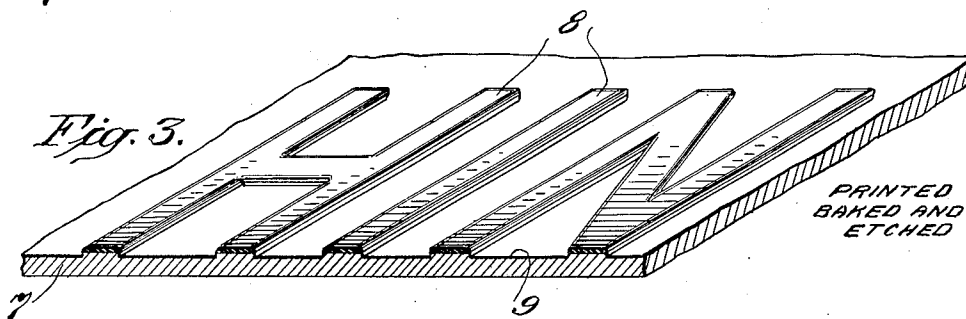
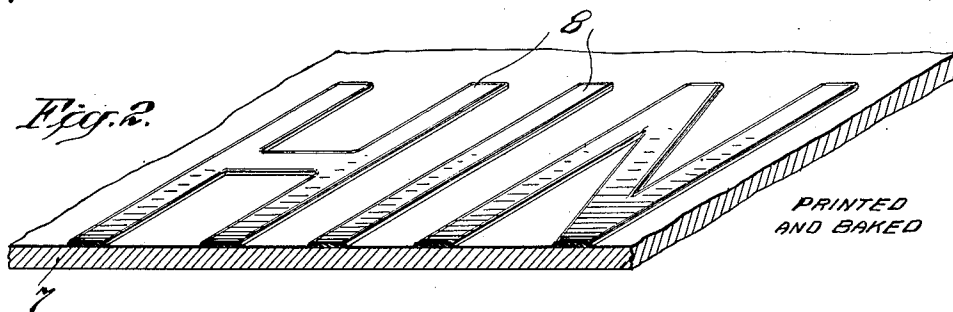
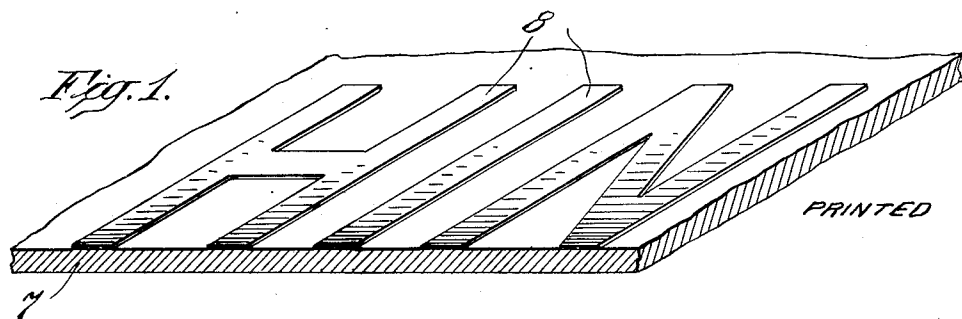
Sept. 5, 1950

E. B. OTT
ETCHING PROCESS

2,521,648

Filed Jan. 29, 1945

2 Sheets-Sheet 1



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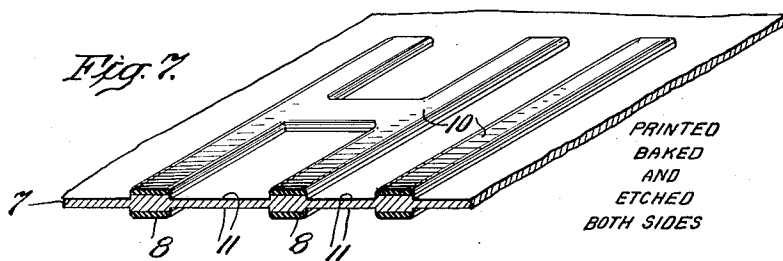
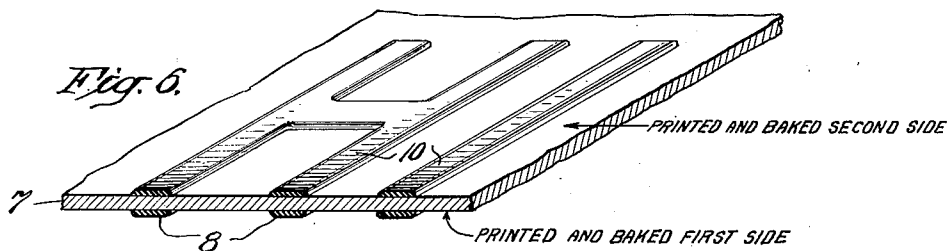
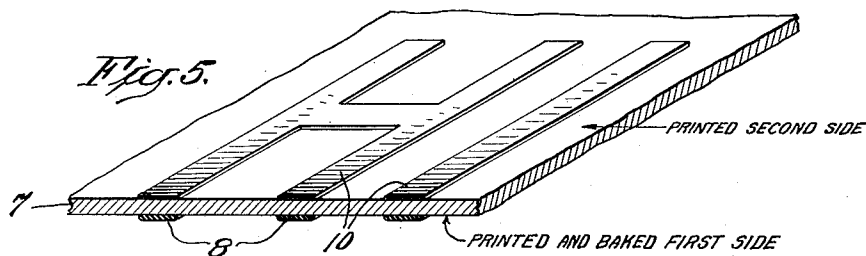
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E. B. OTT
ETCHING PROCESS

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2 Sheets-Sheet 2



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2,521,648

ETCHING PROCESS

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2 Claims. (Cl. 41—43)

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The invention herein disclosed relates to decorating processes involving etched finishes.

General objects of the invention are to simplify and reduce the number of steps and apparatus required and to accomplish savings in time and expense, as compared with previous etching methods.

Further objects are to produce a better product, both in appearance and in physical characteristics, such as in matters of greater durability, wear and weather resisting qualities.

Other objects are to make possible many different variations in the decoration of articles, such as in matters of applying decoration to previously shaped or formed articles, or to one or both sides of a sheet and, in the latter event, to accomplish this with only a single etching step and with the same exact register for both sides.

Other desirable objects and the novel features by which the purposes of the invention are attained are set forth or will appear in the course of the following specification.

The drawings accompanying and forming part of the specification illustrate sequential steps and final results accomplished by the invention, but with the thought that various changes and modification as to this illustration may be made without departure from the true spirit and broad scope of the invention as hereinafter defined and claimed.

Fig. 1 in the drawing is a perspective and part sectional view illustrating the first step of printing or applying the material which is to form the final decorative enamel;

Fig. 2 is a similar view illustrating the step of baking to convert the applied coating material to a hard, acid resistant enamel;

Fig. 3 is a like view illustrating the third and final step of etching the uncovered surface not protected by the enamel;

Fig. 4 is a view like the preceding but illustrating a reverse effect with raised background and sunken characters;

Fig. 5 is a part sectional perspective view illustrating the sheet of Fig. 2, printed and baked on one side, as having been printed on the opposite side;

Fig. 6 is a similar view, after baking on the second side; and

Fig. 7 is a like view of the sheet after a single etching of both sides.

Briefly stated, the invention resides in applying the desired design, either in raised or sunken characters, with an enamel which will bake to a hard, acid resistant condition, then baking to

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convert the covered or what may be termed the "printed" portions to a hard ornamental resist which will constitute the final applied decoration, and then etching the unprinted, uncovered portions.

In Fig. 1 a plate is indicated at 7 having a desired design printed thereon in enamel at 8.

Fig. 2 illustrates in exaggerated form how the enamel may appear after baking into the form of a hard, permanent, acid resistant coating.

With the baked enamel then forming an acid resist as well as a permanent and final decorative coating, the article may be subjected to any usual or special etching process to etch the unprinted, uncovered surface portions, indicated at 9; Fig. 3.

If sunken characters are to be produced the background surface portions may be coated and baked as indicated at 8a in Fig. 4, and the character forming portions be left uncovered and afterwards etched as shown at 9a.

The characters, outlines or designs, either raised or sunken as illustrated, may be produced in any one or any number of colors, the invention thus affording the opportunity for use of multi-colors, color filling and varied backgrounds, borders and designs.

The same processing may be applied to both sides of the sheet and with important attendant advantages.

Fig. 5 shows how after printing and baking at 8, on one side, the sheet may be printed at 10, on the opposite side, with similar enamel, either in the same or different outline and in the same or different color. As up to this time the sheet has not been etched, the edge of the sheet used for register remains unimpaired and so can be used for accurately registering the design on the second side.

The design on the second side is then baked hard, as indicated in Fig. 6.

With both sides printed and baked, the sheet may be put in the etching solution and both sides etched at once, as indicated at 11, Fig. 7.

This single etching step reduces costs to the point of making practical the decorating of both sides in instances which would have been prohibitive from the cost standpoint under old methods.

Instead of printing a design on the second side or back, all or a portion of the back may be coated with a color enamel, for decorative purposes, this being baked to act as a resist in the subsequent etching step. This is particularly desirable for decoratively finishing the backs or irregular or variously formed shapes. This dec-

orative resist may be applied by a spray gun, coating machine, or other means.

The backs of the plates may be coated with the resist enamel which is to form the permanent finish, before applying the design to the front, so that the etching can follow that much more quickly the baking of the design enamel.

A color background may be applied to the etched surface, after etching.

Both or either the decoration or the etching may be multiple instead of single. Thus after applying one enamel decoration and baking, a second, or third and fourth colors may be applied right over the first and baked, to build up multi-color designs, followed by etching of the surfaces left uncovered. Similarly, double or multiple etching may be practiced to bring out the grain of the material and for other decorative effects.

The invention is applicable to all the common metals, such as aluminum, zinc, nickel-silver, copper or copper alloys, Monel metals, stainless steel and to other materials than metals, such as plastics and substances which can be acted on by acids or alkalines in solutions.

The article to which the process is applied may be plain or may have been previously treated or prepared, as by plating, coating, forming, bending, embossing, spinning, piercing, machining, welding or other processing. Any such treatment, preparation of surface or preparation by way of shaping may precede the present decorating and etching process here disclosed.

Multiple designs may be produced by applying the steps of this invention to a piece having all or parts of its surface previously etched or possibly both etched and colored. Thus, for example, the present invention may be applied to a plate having part of the background colored black with an etched hidden metal design under the black.

While usually the hard, resist, enamel forming color may be applied by ordinary printing and screening methods, the invention contemplates that this color may be applied in any way, as by hand, by decalcomania or otherwise.

For general purposes an enamel has been used such as disclosed in the three examples given in Patent 2,279,496 issued April 14, 1942, comprising an alkyd resin base colored with organic pigment and properly reduced to a correct viscosity for printing, screening, stenciling or other method suited to the application to the object to be decorated. Other materials possessing similar resistant properties and of suitable viscosity may be used, particular attention being exercised that the solvents employed are suitable for the base materials treated, such as certain types of plastic or fibre.

The method disclosed gives a deeper, sharper outline to the characters and promotes read-

ability and permanency of character because of the extreme relief or difference in elevation of the contrasted surfaces.

The hard, baked enamel forming the surface of the highlights has better wearing qualities and is less liable to damage than the ordinary coats of decorative enamel applied on plates etched in the ordinary manner. The color permanence is better and the product stands up better under weather exposure.

The invention makes possible a high degree of accuracy in design. Greater handling facility is achieved because of shorter intervals of preparation and fewer production steps and reduced fragility of the decorated surfaces. The product, while of a higher or better quality, actually is of less cost. Many designs impossible of attainment under normal lithographic production methods, such as unusual and odd shapes, may be produced with this invention, particularly by screening or screen printing and use of decalcomanias prepared with the etchant resistant final colors such as described.

What is claimed is:

1. The herein disclosed method of producing etched articles which comprises applying designs in permanent enamel forming resist to the opposite sides of a plate, employing the same original edge of the plate for register of the designs on both sides, treating to convert the enamel to hard, permanent enamel resist on both sides of the plate and then simultaneously etching both sides of the plate in a single etching operation.

2. The herein disclosed method of producing an etched article which comprises printing directly on the surface of an article the design which is to constitute the highlight with an alkyd resin paste which will bake to a hard, permanent, acid resistant finish forming enamel, baking to transform the printed material to the permanent finished highlight and which in such state without further treatment will constitute a resist for etching purposes, and then etching those portions of the surface left exposed by said printed resist and final finish forming enamel.

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