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A. E. FELLNER

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METHOD OF PRODUCING SELECTIVE DESIGNS ON ENAMEL WARE

Filed March 18, 1931

Fig. 1.

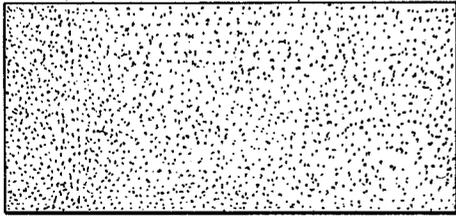


Fig. 2.



Fig. 4.

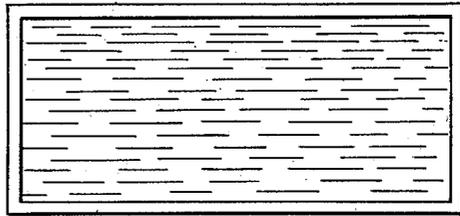


Fig. 3.

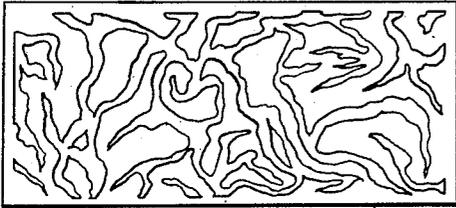


Fig. 6.

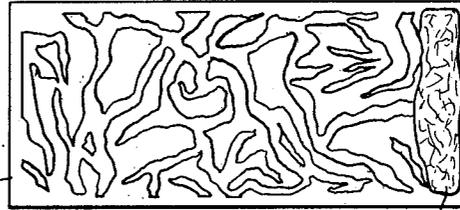


Fig. 5.

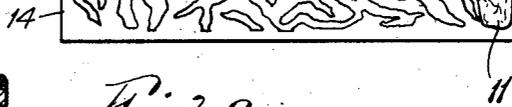


Fig. 7.

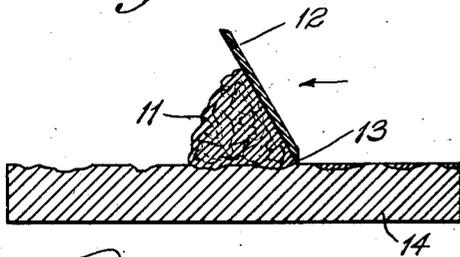


Fig. 8.

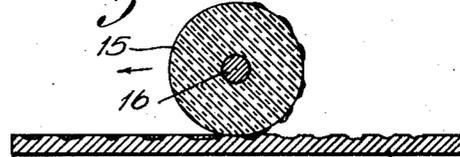


Fig. 9.

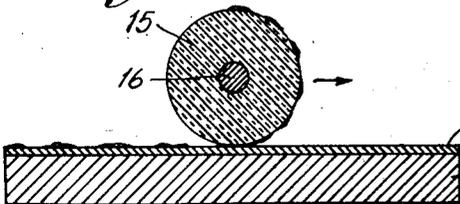
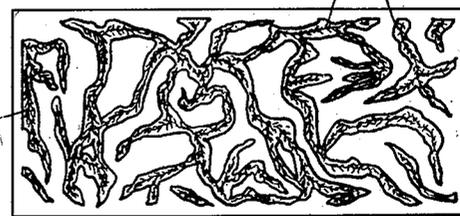


Fig. 10.



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## METHOD OF PRODUCING SELECTIVE DESIGNS ON ENAMEL WARE

Application filed March 18, 1931. Serial No. 523,526.

The object of my invention is to devise a method of producing selected designs on enamel ware, particularly such as used on gas ranges and table tops, etc.

Among the more specific objects of my invention are to produce enamel ware having any desired design and made in imitation of any material, such as wood or marble, and which permits of great latitude of detail in finishing the finer portions of the design, and which permits the production of an embossed design and shading in color and design by the production of high and low lights, and which permits the production of very fine line graining effects.

With these and other objects in view my invention has relation to certain novel features of construction and arrangement of parts and mode of operation, which will be hereinafter claimed and more fully described in the drawing in which

Fig. 1 shows an initial plate of either glass or steel used in my process.

Fig. 2 shows a longitudinal sectional elevation of the plate used in Fig. 1 with a pigment, such as asphalt paint applied thereon.

Fig. 3 is a plan view of Fig. 2 showing a design cut or scratched in the pigment.

Fig. 4 is a plan view of Fig. 3 with a border of the plate framed with putty or other similar material, so as to confine a liquid and with a liquid within the confines of the frame, completely covering the surface of the exposed plate.

Fig. 5 is a longitudinal sectional elevation of the plate illustrated in Fig. 4 showing the etching effect of the acid that is used on the plate on the designed portion.

Fig. 6 shows the plate with the frame removed and the design etched thereon.

Fig. 7 is an enlarged fragmental sectional elevation of Fig. 6 showing the process of distributing a mixture of powdered enamel and oil over the plate on to the etched portions, but not on the elevated unetched portion, between the design.

Fig. 8 shows the plate 7 after the etched portions have been filled with the mixture of powdered enamel and oil and also a transverse sectional elevation of a rubber roller in

the process of being rolled over the plate in the direction shown by the arrow and picking up the mixture of powdered enamel and oil from the etched design portion of the plate to the roller.

Fig. 9 shows an enameled panel, the lower cross section portion representing the sheet metal portion and the smaller cross section portion at the top, the enamel. In this figure the roller shown in Fig. 8 is being rolled over the enameled surface of the plate in the direction shown by the arrow, thereby removing the coating of powdered enamel and oil from the roller and placing it on the enameled plate.

Fig. 10 designates a plan view of a finished enameled plate showing the desired design placed thereon and ready to be baked in an oven to secure its permanence and solidity.

The description of the figures to a very large extent describe the process. In more detail, the process is the following:

A plate of either glass or steel, preferably rectangular in shape and large enough for a complete design, is used. This plate is placed horizontally on a table and painted thoroughly with a reasonably thick coating of paint. Paint must be used that is not affected by hydrofluoric acid, such a paint is asphalt paint. The paint is permitted to dry. With a knife or other sharp tool the desired design is cut or scratched in the paint coating on the plate. The plate is then exposed where the design is cut or scratched. The design as made is shown in Fig. 3. It now becomes necessary to etch the design that has been made in the paint coating in the plate. This is done, as follows:

A wall of putty of similar substance that is not affected by hydrofluoric acid is built up around the edges of the plate, practically framing it. This wall must be made so that it is a barrier against liquid. When this is accomplished, hydrofluoric acid is poured on the plate within the barrier, so as to completely cover the plate within the barrier. The acid is permitted to remain in this position until the chemical reaction takes place between the glass or metal and the acid thereby etching the metal or glass where the latter

is exposed to the acid. Since the acid does not effect the painted coating, only the portion of the plate representing the design will be etched. The etching represents counter-sinking the design in the plate. The depth of this design may be controlled by the length of time that it is exposed to the acid and by the strength of the acid. When the etching process has been completed, the hydrofluoric acid is removed, and the frame barrier is removed, as well as the paint that was applied to the plate in the initial process. The plate is then thoroughly washed and cleaned. This plate may be used repeatedly in the subsequent process. This plate represents the key or match plate of the process. In other words, the artistry required to make the design is not subsequently necessary.

The next step in the process is to apply a mixture of powdered enamel and oil to the etched surface of the plate. This is done by placing a heap of the mixture of powdered enamel and oil at one edge of the plate. This heap is designated by the numeral 11 in Fig. 7. Numeral 12 designates a scraper having the sharp edge 13 and of the same or slightly greater width than the width of the plate 14.

The scraper 12 is scraped in the direction of the arrow shown in Fig. 7 across the length of the plate 14, with the heap 11 immediately behind it. By this means the mixture of powdered enamel and oil fills the etched depressions of the plate 14, but does not cover the unetched portions of the plate 14, because in the process of scraping the scraper 12 removes the mixture of powdered enamel and oil from the high spots or areas, but permits the depressions to be filled up.

The next step involves the use of the rubber roller 15 having the axle 16. The rubber roller 15 is made of solid spongy rubber, which is very resilient. The rubber roller 15 is at least as wide as the plate 14, but preferably not a great deal wider. The axle 16 extends beyond the rubber roller 15 on both sides.

The next step involves transferring the design from the plate 14 to the rubber roller 15, that is it involves transferring the mixture of powdered enamel and oil from the etched depressions of the plate 14 to the surface of the rubber roller 15. The circumference of the roller 15 must be at least as long as the plate 14 and preferably not a great deal longer. The roller is placed as shown in Fig. 8 at one end of the plate 14. Pressure is then applied on the axle 16 and the rubber roller 15 rolled to the left in the direction of the arrow in Fig. 8, until one complete revolution of the roller has been made. In this step in the process, it is highly necessary that the roller be not permitted to slide. In Fig. 8 the roller 15 is shown in about its intermediate position between the ends of the plate 14. The mixture of pow-

dered enamel and oil adheres to the rubber roller, and on account of the pressure on the rubber roller all of the mixture is removed from the etched depressions in the plate 14. That is to say the design has been transferred from the plate 14 to the lateral surface of the rubber roller 15. It is to be noted that the greater the etched depressions the higher the elevations of the design will be on the rubber roller 15.

The process resembles that of wrapping the design around the rubber roller 15.

The next step is to transfer the design from the rubber roller 15 to the plate 17. The plate 17 is enameled as shown at 18 in its completed form before the design is transferred from the roller 15. The roller is placed at one end of the plate 17 as it was on the plate 14 and rolled in the direction indicated by the arrow in Fig. 9, under pressure applied to the axle 16 until the entire design is pasted or stuck on the plate 17. It is likewise necessary in this operation that the roller be not permitted to slip. This operation resembles an unwinding of the design from the roller 15 and laying it flatly on the plate 17. The plate 17 is then placed in an oven and the design baked on just as all enamel is baked on metal. When removed, from the enameling oven and permitted to dry, the plate 17 will assume the appearance shown in Fig. 10. Within the limitations necessarily existing in an inked drawing, Fig. 10 shows the delicacy of design, which is permitted. If the enamel 18, on the plate 17, is, for instance, blue, and the design white, the small hair lines 19 will grade in color from white to a delicate grey or cream color. It is possible to reproduce the finest hair line shading or illustration.

What I claim is:

1. A method of the character described, which consists in making a master plate by coating a blank plate with a substance that is not affected by the chemical reaction of an acid that will chemically react with the substance of which the blank plate is made, scraping or cutting a desired design in the substances on the plate and etching the design in the plate by the application of acid, filling the depressions of the design on said plate with a viscous material, applying the viscous material filling the depressions of the etched design to a resilient roller by passing the roller over said plate and transferring the viscous material forming a design from said roller to a given plate by rolling said roller over said given plate and then baking said given plate.

2. In a method of the character described, making a master plate, which consists in coating a sheet of glass or metal with asphalt paint, carving a design in said paint, after it has dried, building a confining wall around said plate, and covering said plate with

hydrofluoric acid, until the exposed portions  
of said plate are etched, removing the acid  
confining means as well as the acid, and wash-  
ing the plate, then filling the etched depres-  
5 sions on said plate with a mixture of pow-  
dered enamel and oil by scraping a heap of  
the same across said plate, thereby permitting  
it to fill the depressions and removing it from  
the elevations, then transferring the mixture  
10 in the design form from said plate to a resili-  
ent rubber roller by applying pressure to  
the roller and rolling it from one end of said  
plate to the other over the etched depressions,  
then transferring the design from the roller  
15 to a given plate by rolling said roller from  
one end of said given plate to the other under  
pressure, and then baking the given plate.

In testimony whereof I affix my signature.

ALPHONSE E. FELLNER.

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