Dec. 2, 1930. J. C. McFARLAND 1,783,663

ETCHING PRECIOUS METALS

Filed June 22, 1928

Fig. 1.

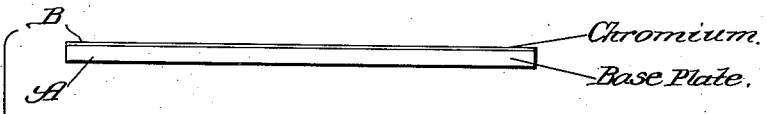


Fig. 2.

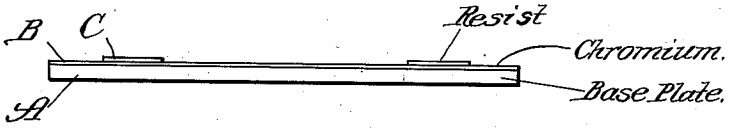


Fig. 3.

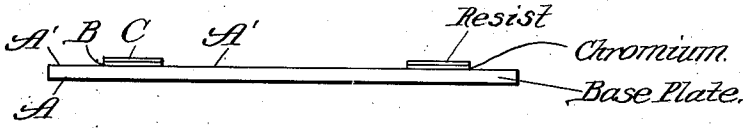


Fig. 4.

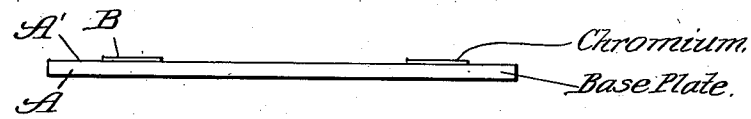


Fig. 5.

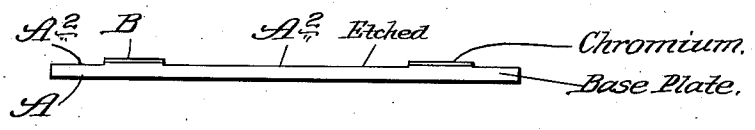


Fig. 6.

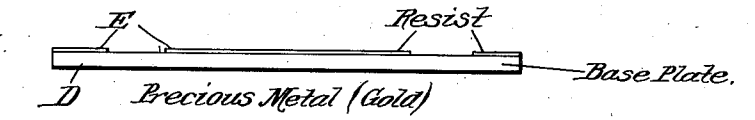


Fig. 7.

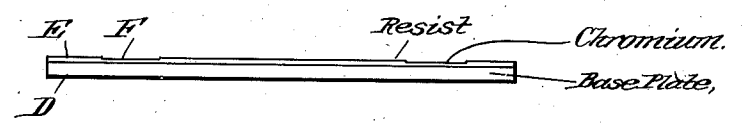


Fig. 8.

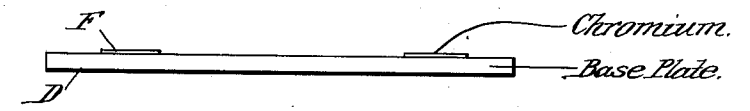


Fig. 9.

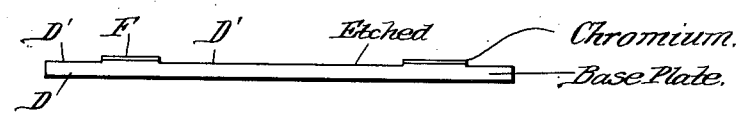
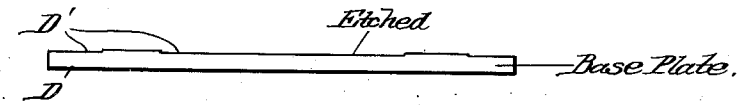


Fig. 10.



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Attys.

Patented Dec. 2, 1930 1,783,663

UNITED STATES PATENT OFFICE

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ETCHING PRECIOUS METALS

Application filed June 22, 1928. Serial No. 287,538.

This invention relates particularly to a method for etching precious metals; and the primary object is to provide a simple and efficacious method for the purpose indicated.

In the improved method, chromium plating preferably is used in the form of a resist design covering certain areas of the precious metal. The exposed areas of the precious metal may be etched by employing a suitable etching agent.

In the accompanying drawing, the preferred method is illustrated in Figs. 1–5; and a modified method is illustrated in Figs. 6–10.

The improved method may be used in etching the surfaces of watch cases, or any precious metal surface.

In the drawing—

Fig. 1 illustrates the first step of the preferred method in which chromium plating is applied to the surface; Fig. 2 represents a further step in which a suitable resist design is applied to the chromium plating; Fig. 3 represents a further step in which the chromium plating is removed at the exposed areas; Fig. 4 represents a further step in which the resist is removed; Fig. 5 represents a further step in which the exposed surfaces of the precious metal are etched while the chromium plating design serves as a resist; Fig. 6 represents the first step in a modified procedure, in which a suitable resist design is applied to the surface of the precious metal; Fig. 7 represents a second step in which the chromium plating is applied to the exposed areas of the precious metal; Fig. 8 represents a third step in which the resist is removed, leaving the precious metal bearing a chromium plating design; Fig. 9 represents a further step in which the exposed areas of the precious metal are etched; and Fig. 10 represents the etched object after removal of the chromium plating design.

Referring to Figs. 1–5, A designates a precious metal object, or plate; B designates a chromium plating applied to the surface; C designates a suitable resist design applied to the chromium plating; A′ designates the exposed surface of the precious metal plate after removal of the chromium plate throughout the exposed areas thereof; and A^2 designates the etched areas of the precious metal body.

Referring to Figs. 6–10, D designates a precious metal body; E designates a suitable resist design applied thereto; F designates a chromium plating design applied to the exposed areas of the precious metal surface; and D′ designates the etched areas of the precious metal body.

The process is applicable to the decoration of the surfaces of various precious metals, such as gold, silver, platinum or their alloys.

In the preferred procedure illustrated in Figs. 1–5, the entire precious metal surface to be treated is first plated with chromium; a suitable resist design is then applied to the chromium plating; the chromium plating is then removed at the exposed areas, as by means of dilute hydrochloric acid, or dilute sulphuric acid; the resist is then removed; and the precious metal surface is then etched by means of a suitable etching agent. For example, a suitable cyanide solution may be used for etching gold. During the etching operation, the chromium plating serves as a resist. After the etching operation, the chromium plating may be removed, if desired. The etched blank may then be further decorated in any desired manner. If one so desires, the etched gold surface, for example, may be plated with platinum; and the chromium plating design may afterwards be removed.

The modified method illustrated in Figs. 6–10 will be understood without further description.

In lieu of chromium plating, lead may be used, if desired. Where lead is so used, nitric acid may be employed to remove it after the lead has served as a resist in the etching of the gold surface, for example.

Where a chromium plating design is used as a resist in the etching operation, the chromium plating may be allowed to remain, if desired. Such a plating is hard, resistant, will not tarnish, and possesses a color somewhat similar to the color of aluminum.

The resist may be applied to the metal surface in any desired manner. Preferably, the

metal surface is coated with a light-sensitive varnish; the film is then acted upon by light transmitted through a transparency having thereon a picture, design, or character; and the unreacted portions of the varnish are then removed by a suitable developing operation.

Chromium plating is hard, resistant, and free from tarnishing. It has been demonstrated that it will serve effectively as a resist against those agents which can be used in etching gold and other precious metals and alloys. It is preferred to use chromium plating rather than lead plating, or some other metal plating, as a resist in etching precious metal surfaces. It may be added that chromium plating is much superior to ordinary resists for use in etching precious metal surfaces.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible, in view of the prior art.

What I regard as new, and desire to secure by Letters Patent, is:

1. The method of etching precious metals, which comprises: applying to the surface of the metal a chromium plating adapted to serve as a resist to the etching fluid for the precious metal; etching the exposed surface of the precious metal while said plating design serves as a resist; and removing the chromium plating.

2. The method of etching precious metals which comprises: applying to the surface of the metal a chromium plating adapted to serve as a resist to an etching fluid for the precious metal; and etching the exposed surface of the precious metal while said plating design serves as a resist.

3. The method of etching precious metals which comprises: applying a suitable resist to the precious metal, plating the exposed surface of the precious metal with chromium, removing the resist, etching the exposed surface of the precious metal while the chromium serves as a resist, and removing the chromium.

JAMES C. McFARLAND.