April 2, 1935. G. E. BARNHART 1,996,187

METHOD OF MARKING PLATED ARTICLES

Filed Jan. 24, 1933

FIG. 3.

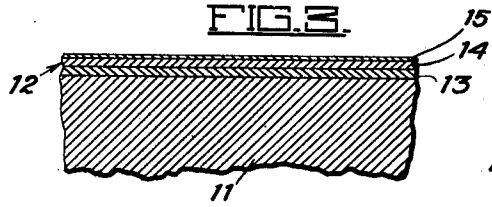


FIG. 4.

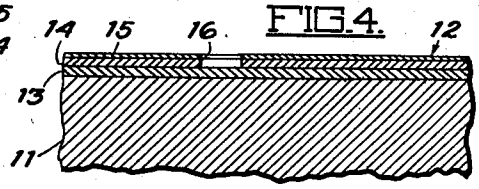


FIG. 5.

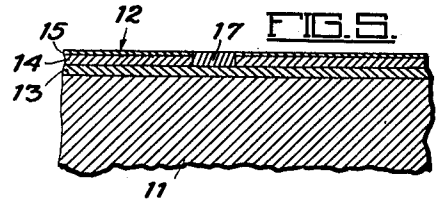


FIG. 1.

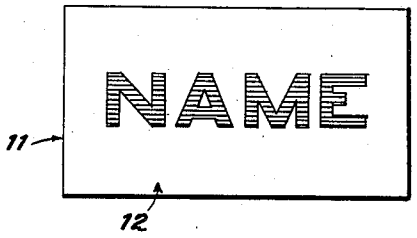


FIG. 6.

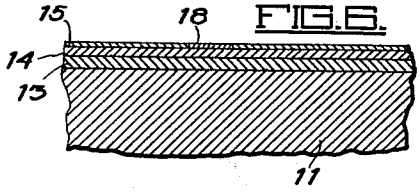


FIG. 2.

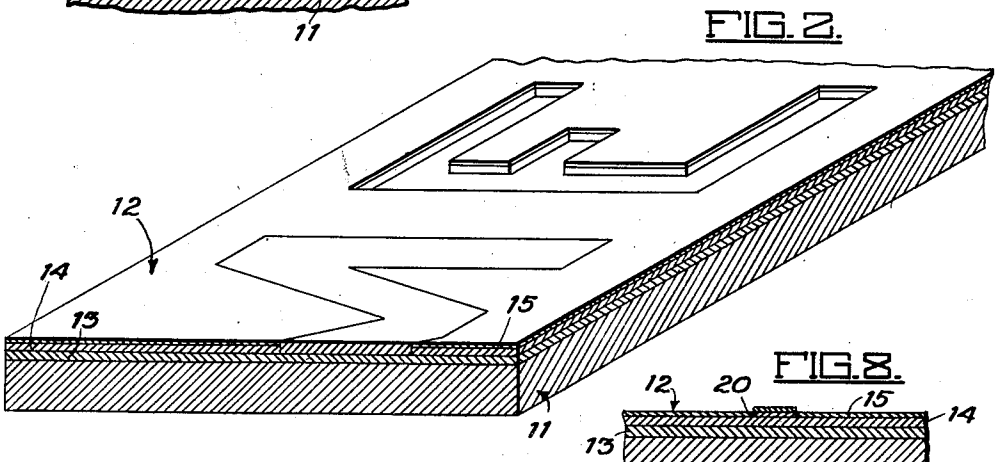
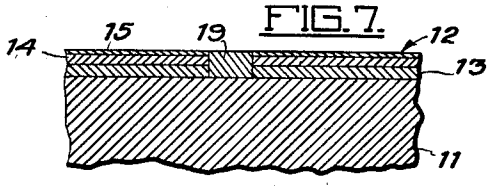


FIG. 8.

FIG. 7.



INVENTOR
GEORGE E. BARNHART
BY Frank R. Graham
ATTORNEY

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METHOD OF MARKING PLATED ARTICLES

George E. Barnhart, Pasadena, Calif.

Application January 24, 1933, Serial No. 653,261

2 Claims. (Cl. 41—18)

This invention has to do in a general way with the art of marking metal plated articles, and is more particularly related to the art of placing names, trade-marks, designs, and the like on metallic or other articles, such as golf club heads, golf club shafts, swords, automobile headlights, table ware, boudoir articles, cigar lighters, watches, pencils, scientific instruments, musical instruments, identification plates, and the like, the surfaces of which are plated with metal.

It is a primary object of this invention to produce a method of marking articles of the class described in a manner such that the mark or design lies entirely within the plate and does not effect in any way the strength or characteristics of the base metal or base material.

The method contemplated by this invention is especially adapted for use in connection with chromium plated articles, since it takes advantage in a novel way of the fact that the adhesive qualities of chromium are very selective, (and that chromium plate is not deposited to an appreciable thickness), to provide a process which can be efficiently practiced at a minimum cost for labor and material, and to produce results which are new and distinctive in appearance.

The method contemplated by this invention, as pointed out above, contemplates inlaying the design or mark within the plate itself. In this connection, it is a well known fact that, in view of the properties pointed out above, a chromium plated article is, for satisfactory wear without peeling, formed of three layers of metal in the plate. The base metal, usually iron or steel, is first plated with copper, which adheres strongly to the iron. Chromium will not adhere satisfactorily to the copper so a plating of nickel is applied to the copper to provide a base for the chromium.

The marking of chromium plated articles has heretofore been done by painting or stamping, both of which being undesirable from the standpoint of wear and appearance. Furthermore, the stamped marks have the undesirable property of weakening light metal parts.

It is a further object of this invention to produce a process of the class described wherein the chromium is removed in the regions necessary to form the mark or design, thereby exposing one of the under layers of metal. The removal of the chromium may be effected by an acid etching process, using a stop-off in the usual manner, or it may be done by engraving, by an acetylene torch, by an electric means, or by an abrasive cutting tool. In the case of the regional application of heat (the acetylene torch or the "electric means") it is to be understood that the "removal" of the surface plate may be effected only in that the surface metal forms an alloy having different characteristics (color and affinity for other plating metals) from those of the original surface plate. In any event, it is one feature of the process contemplated by this invention that the regional removal of plating material is not carried to a thickness beyond the plate itself; in other words, the design or mark does not extend into the base metal, except where my method of depositing metal is used on an engraved or stamped surface for further ornamentation of the marking.

After the design has been cut or etched into the plate to the desired thickness, a coating of metal, having color contrasting with the surface metal, is deposited on the exposed metal in the design or mark. For example, gold, copper, silver, or nickel may be deposited in the mark by immersing the article in an electric or other suitable plating bath. Due to the fact that chromium is practically inert to the action of copper plating baths, it is an important feature of my invention, when it is practiced with chromium, that no stop-off need be used in plating the mark or design with copper.

It is a still further object of this invention to produce marks or designs of the class described having non-metallic colors. This object is accomplished by treating the surface of the metal deposited in the design or mark with an oxidizing or other suitable reagent which will react with the metal to deposit therein an oxide or a salt having the desired color.

Since chromium will deposit to only a very small thickness, it becomes a still further object to take advantage of this fact to produce a raised or embossed effect in the design or mark. This is accomplished by depositing the inlay metal to a point at which it is even with or above the surface of the chromium, after which it may, if desired, be plated with chromium or another suitable metal.

The details in the process contemplated by this invention, together with other objects attending its production, will be best understood from the following description of the accompanying drawing, which is chosen for illustrative purposes only, and in which,

Fig. 1 is a plan view illustrating an article, such as a name plate, or a portion of any other article which has been marked in accordance with my invention;

Fig. 2 is a perspective view, partly in section, which illustrates two of the steps followed in practicing one method of the invention;

Fig. 3 is an enlarged fragmentary section which may be considered as having been taken through an article having a three layer plate thereon;

Fig. 4 is a section similar to Fig. 3, illustrating one step in the method contemplated by this invention;

Fig. 5 is a section similar to Fig. 4, illustrating another step in the method;

Fig. 6 is a section similar to Fig. 3, illustrating another manner of practicing the method;

Fig. 7 is a section simialr to Fig. 3, illustrating still another result contemplated by my invention; and

Fig. 8 is a section similar to Fig. 7 and illustrates another result contemplated by this invention.

More particularly describing the invention as herein illustrated, reference numeral **11**, as applied to Figs. 1 to 8 inclusive, indicates, what I may term, a base member which is preferably a metal, but which may be of any other suitable material that will receive a metal plate.

Reference numeral **12** is generally applied to indicate a plate electrically or otherwise deposited upon the surface of the base member **11**. In the form chosen for illustrating this invention, I have represented the plate as being composed of three layers, and, since chromium lends itself particularly to the use of my process, as has been pointed out hereinabove, I will describe the plate as comprising a layer **13** of copper which is deposited directly upon the base metal.

In order to provide a good bonding surface for the chromium, the copper plate **13** is coated with a nickel plate **14**, upon which the final thin plating of chromium, indicated at **15**, is deposited.

As has been pointed out above, the essence of this invention resides in laying the design or mark within the plate itself, and Figs. 4 and 5 indicate one method of doing this. In Fig. 4, reference numeral **16** indicates a recess or groove which may be considered as forming a part of a mark or design, such recess or groove being formed by the regional removal of a part of the plate metal. This so-called regional removal can be effected in any conventional way, such as by means of an acid etching process, or by engraving, or by cutting with a suitable torch or a suitable abrasive wheel.

In the event an etching process is used to produce the groove shown in Fig. **4**, an acid may be employed which will attack both the chromium and the nickel. For this purpose, I may use a sulphuric acid electric bath, removing the article from the bath when the acid begins to attack the copper. It will be understood, of course, that in etching the plate in this manner, a suitable wax or other stop-off must be used on the surface of the chromium in the conventional manner.

After the design has been formed by the regional removal of the plate material, the article is then immersed in a plating bath adapted to deposit the desired metal on the exposed surface of the copper. This bath may be a copper electro-plating bath, a copper cyanide plating bath, or it may even be a gold, silver, nickel or other metallic plating bath, depending upon the ultimate color effect desired in the design. In the event a stop-off is used in etching the design, the stop-off material may be left on the article during the plating operation, thereby protecting the surface plate.

Inasmuch as copper will not readily adhere to the chromium plate on the surface, it is not necessary, when chromium forms the surface metal, to use a stop-off in this copper plating operation. This is particularly useful when the design is formed by an engraving or other cutting process.

After the inlaid metal, which is indicated by reference numeral **17** in Fig. 5, has been deposited, the surface of this metal may be colored by subjecting it to the action of a suitable oxidizing agent or other suitable reagent to form an oxide or a salt in the surface of the inlaid metal.

As an alternative method of practicing the process, I may chemically etch the chromium with an acid, such as diluted hydrochloric acid, which will not attack the nickel. With this reagent, the mark or design is formed in the chromium plate only, thus exposing the surface of the nickel, and, in this case, the inlaid metal, indicated at **18** in Fig. 6, is deposited on the nickel. As pointed out above, the inlaid plate may be of any suitable metal which will effectively adhere to the nickel.

As another alternative in practicing the process, I may etch or engrave the plating so that the mark or design extends clear through the plating metal to the surface of the base metal. It is an important feature of the process, however, that the mark or groove does not project into the surface of the base metal in a manner such as to alter or destroy its structure or strength, except in cases where my process is used to add to the value of engraving or designs on work that has ample structural strength. This form of the invention is illustrated in Fig. 7 where the inlaid metal, indicated by reference numeral **19**, is shown as being deposited upon the surface of the base metal **11**.

When chromium or another similar metal is used to form the outside surface of the plate, my invention, as has been pointed out hereinabove, may be effectively used to obtain a raised or embossed effect without stamping or in any way affecting the base metal or the internal structure of the plate metal.

This is accomplished, as shown in Fig. 8, by first etching through the chromium to any desired extent in the manner shown in Figs. 5, 6, or 7.

In Fig. 8, for illustration, I have shown the first inlaid metal, indicated by reference numeral **20**, as being deposited on the surface of the nickel. This metal may be either nickel or copper, preferably copper, which does not readily adhere to the chromium, but has strong adhesive properties relative to the nickel. After this inlay has been deposited to the desired extent, at which its outer surface is flush with or extends beyond the outer surface of the chromium, the inlay metal **20** may, if desired, be plated with another metal, such as chromium, to give a raised or embossed effect in the same color as the balance of the plate, when the inlay is one to which chromium will adhere.

In addition to the methods outlined above, the results contemplated by my invention, (that is, the placement of a mark or design within the plate itself), may also be accomplished by sandblasting the plated article through a suitable stencil, or by using an electric pencil arc, which, in the case of a chromium, nickel and copper plate, fuses the plate metal together to give a black mark or design. Other color effects may, of course, be obtained with different plate metals or alloys.

It will be apparent from the foregoing description that the method contemplated by this invention provides convenient, efficient, and economical means of marking any plated article without in any way affecting or changing the internal structure of the base metal or the plate metal.

It is to be understood that, while I have used chromium plate as an example to illustrate the invention, the invention is not necessarily limited to chromium but, in its broader aspects, may be practiced with any other metal plate. It is, therefore, to be understood that, while I have herein described and illustrated certain preferred procedures followed in the practice of the invention, the invention is not limited to the examples given, but includes within its scope whatever changes fairly come within the spirit of the appended claims.

I claim as my invention:

1. The method of marking a plated article which comprises fusing the plate metal with a pencil torch to form a mark which differs in color from the color of the plate.

2. The method of marking a plated article which comprises fusing the plate metal with an electric pencil torch to form a mark which differs in color from the color of the plate.

GEORGE E. BARNHART.