

A PROCESS FOR DEPOSITING GOLD ON THE SURFACE OF AN
ARTICLE OF TIN OR A TIN BASED ALLOY

The invention relates to a process for depositing gold on tin and tin alloy surfaces such as pewter by selective plating. This process can be applied to plate intricate designs on pewterware such as pewter tableware, flower vases, clocks, plaques and other decorative articles.

Currently pewterware such as plates, goblets, beer tankards, flower vases, clocks and other decorative articles are commercially available in its natural metallic finish. To enhance the aesthetic appearance thus increasing the market value it is desirable to plate gold on certain parts (designs, motifs) of the ware. One method for decorating ware in this way involved masking off all surfaces of the pewterware except the patterns or designs to be gold plated. The workpiece is then jigged, degreased, activated and gold plated in a plating bath. Owing to defective masking, difficulty in getting an appropriate masking system and relative soft nature of pewter, which is prone to damage during plating, the plated workpieces generally end up with extensive renovation work such as having to polish off metals (e.g. nickel, gold) that are deposited on various parts designated not to be plated, unsightly jig marks and unattractive finish. The said method is tedious and

laborious. Hence it has not been used for gold plating of tin based products on a commercial scale.

Furthermore, owing to its amphoteric nature tin is difficult to plate. These are the likely reasons for pewterware to be available in its natural finish and not in combination with gold.

It is an object of this invention to provide a novel practical and easy to operate process for depositing an attractive gold coating on defined motifs, designs or patterns on metallic surfaces such as pewter to enhance the commercial value of fabricated metal products such as pewter tumblers, flower vases, clocks, plates, etc.

It is a further object of this invention to lower the processing cost by minimising renovation of reworks.

According to the present invention, there is provided a process for depositing gold on the surface of an article of tin or a tin based alloy comprising masking an area of the article so that an unmasked area is surrounded by the masked area and depositing gold on the unmasked area of the article by selective electroplating in which a stylus is used to plate the area within the mask.

The new process is much less pollutive and does not require personnel highly skilled in the operation of conventional tank electrolytic plating techniques.

There are various ways of masking all surfaces except the motifs or patterns that are to be gold plated by the said method. It is only necessary to mask only the

adjacent areas surrounding the motif to be plated. This can be carried out by printing, silk screening or taping commercially available masking materials on parts not to be plated. In the conventional method the whole work except the designs for gold deposition has to be masked as it has to be totally immersed in the plating solution.

Other techniques include masking the metal surfaces with a chemical resistant lacquer. After the mask application desired patterns are engraved or cut on the metal substrate. The engraved design (with no lacquer on) can then be degreased to remove soils and oils, activated to expose a chemical clean metal surface, nickel or other metal plate (optional) and gold plate to customers' specifications. If gold plating is to be applied to the raised part of a design, the mask on the raised surfaces can be removed e.g. by polishing, leaving a clean metal surface for gold deposition.

The metals are deposited on the metal substrate by selective plating. Currently main applications of selective plating are on industrial components such as tool, die, printed circuit, shaft and bearings. It is mainly used for repair or defective or worn out parts. It has been established, contrary to expectations, that this plating technique can be used to plate intricate motifs on tin based surfaces such as pewter with very attractive finish using the said procedure of masking and surface pretreatment.

None or very little gold plates on the masked off adjacent areas hence there is hardly any need to remove the gold from surfaces that are not part of the gold plated design/motif. The use of a stylus (anode) of an appropriate size and shape would help to contain the undesirable deposition of metals on the masked off areas.

Selective plating equipment and cleaning and plating solutions are commercially available. Each plating equipment consists of a special direct current power supply (rectifier) connected by means of flexible cable to the cathode (workpiece for plating). The anode is the stylus which is covered with a plastic jacket or an absorbent pad of cotton or other material and this is connected to the rectifier by a flexible cable. During operation the anode with the absorbent jacket/pad is wetted with specially formulated electrolyte for electrocleaning or plating.

The process sequence for this gold plating process is as follows:-

Finish the pewterware to the required texture. Selectively mask the areas of the clean pewterware to be gold plated by one of the techniques given below or other means.

(a) Print or silk screen the masking composition around the design to be plated.

- (b) Coat part or whole pewterware with masking chemical such as a chemical resistant lacquer. Cure the coating according to manufacturer's instructions. Cut or engrave the pattern/design on the masked surfaces. The trimmed or cut designs with no masking material can then be gold plated.
- (c) Applicable to pewterware with raised design for partial gold plating. Coat part or whole pewterware with a mask. Remove the masking material from the raised parts by buffing.

EXAMPLE

Foreign soils and oils on a pewter article are removed by soak or swap cleaning. A cathode cable is attached to the pewterware via an area with no mask. An anode is wetted with an appropriate cleaning solution for tin based metals. The design/motif for plating is electrocleaned according to the supplier's specification followed by rinsing off of chemicals. A stylus for nickel (optional) or other metal plating is attached and plating is carried out according to instructions provided. The chemicals are rinsed off thoroughly. The motif is gold plated immediately according to specifications provided. The article is rinsed thoroughly and dried. If metals are plated on the adjacent areas due to faulty masking, the electrodeposited metals are buffed off. The plated ware is cleaned. The lacquer is removed.

The gold electroplate as applied by said technique is firmly adherent to the difficult to plate tin based alloys. The said process can be applied on a production scale.

**CLAIMS**

1. A process for depositing gold on the surface of an article of tin or a tin based alloy comprising masking an area of the article so that an unmasked area is surrounded by the masked area and depositing gold on the unmasked area of the article by selective electroplating in which a stylus is used to plate the area within the mask.
2. A process as claimed in claim 1, wherein the masked area is masked by printing.
3. A process as claimed in claim 2, wherein the printing is silk screen printing.
4. A process as claimed in claim 1, wherein masking is carried out by coating part or all of the article with a masking chemical and then the coating is cut away to leave the unmasked area.
5. A process as claimed in claim 1 for use with an article with a raised design, wherein the article is masked by coating the whole or part of the article with masking material, the masking material on the raised area is removed by buffing to leave an unmasked area.
6. A process as claimed in any of claims 1 to 5, wherein after masking, the article is cleaned by soak cleaning or other means.
7. A process for depositing gold on the surface of an article of tin or a tin based alloy substantially as hereinbefore described with reference to the Example.



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8. An article of tin or a tin based alloy on the surface of which gold has been deposited by a process as claimed in any of claims 1 to 7.