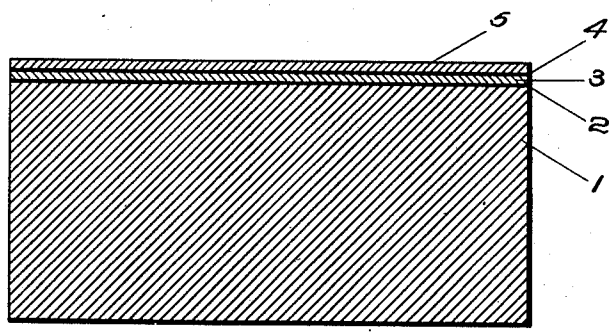
Feb. 2 , 1926. 1,571,540

V. D. DAVIGNON

PLATED METAL AND METHOD OF PRODUCING THE SAME

Filed Feb. 27, 1924




Inventor:
Victor D. Davignon,
by Emery Booth Janney Varney
Attys.

Patented Feb. 2, 1926. 1,571,540

# UNITED STATES PATENT OFFICE.

VICTOR D. DAVIGNON, OF NORTH ATTLEBORO, MASSACHUSETTS, ASSIGNOR TO GENERAL PLATE COMPANY, OF ATTLEBORO, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

## PLATED METAL AND METHOD OF PRODUCING THE SAME.

Application filed February 27, 1924. Serial No. 695,520.

*To all whom it may concern:*

Be it known that I, VICTOR D. DAVIGNON, a citizen of the United States, and a resident of North Attleboro, in the county of Bristol and State of Massachusetts, have invented an Improvement in Plated Metal and Methods of Producing the Same, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to plated metal and methods of producing the same, and consists in improvements in that class of plated product which comprises a backing or base of relatively cheap metal surface with a thin film of relatively precious metal produced by a process of mechanical attenuation.

In the production of plated metal of this class it is customary to start with a block or bar of cheaper base metal, such, for example, as brass or nickel silver, on which is placed a thin sheet of precious metal, such as gold, with an interposed thin sheet of fusible solder, such as silver solder. The precious metal is then fused to the base metal in a soldering furnace and the blank comprising this composite block or bar subjected to a rolling, drawing or other mechanical process designed to reduce the aggregate thickness of the unitary piece, such process being carried to a point where the precious metal is left as a thin surface coating on the usually relatively thick base metal body.

Mechanically fabricated plated work is in great demand and is much more durable and wear resisting than that produced by the electro-plated process. In the production of the more inexpensive grades of plated ware, however, mechanical attenuation by rolling or otherwise is carried to the point where the surface coating of precious metal is not only reduced to a very thin film, but this tends to become distributed over the base metal surface in fine particles and apparently separated at imperceptible intervals or comingled at places with particles from the soft underlying base metal into which it has been worked.

In the production of inexpensive gold or other precious metal rolled plate a point is soon reached where the product is susceptible to discoloration, oxidization or other similar effects due to the exposure of the base metal particles on the surface of the plate. This readily becomes apparent by subjecting the material to the well-known test with nitric acid. This characteristic renders the product less available for use in jewelry manufacture or other similar purposes.

The present invention contemplates the production by mechanical processes, similar to those heretofore employed, of a plated product comprising a surface of gold or other precious metal on a base of relatively inexpensive metal where the precious metal surface may be reduced to a thinness heretofore incapable of resisting the acid test, but nevertheless presenting a resistance to the acid test and to discoloration and tarnishing, similar to that of heavier and more expensive plate.

The invention will be best understood by reference to the following description when taken in connection with the accompanying illustration of one specific embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

The drawing shows more or less diagrammatically and conventionally a cross section of a composite bar or block which may be used in carrying out one form of the herein described process.

To illustrate one method of carrying out this invention, a block or bar 1 of a relatively cheap base metal, such, for example, as brass or nickel silver, is first procured. The dimensions are immaterial but for the sake of illustration they may be 12 or 14 inches long, from 2 to 4 inches wide and ¾ of an inch thick. On top of this block or bar is placed a thin sheet 2 of solder which, for example, may be silver solder .003 of an inch thick. Other soldering materials might of course be employed. On top of this there is then laid a thin sheet 3 of a metal offering a strong resistance to oxidization and capable of standing up under the nitric acid test. A suitable metal for this purpose is a ferrous alloy including chromium and another metal of the iron group, such as nickel. Such alloy, for example, might consist of 67%, or thereabouts, of iron, 30%, or thereabouts, of nickel and 3%, or thereabouts, of chromium. The invention contemplates the use of other acid

resisting metals, such as aluminum or aluminum alloys, but the first mentioned metal has the advantage of being relatively hard and tenacious as compared with the base metal 1 and also offers greater resistance to heat than aluminum. Still other acid resisting metals might be used, such as malleable chromium.

The sheet 3 of acid resisting metal may be of any desired thickness, but in the illustrative example a sheet .02 of an inch thick will suffice. On top of the sheet 3 of acid resisting metal there is then laid another sheet of solder 4, similar to the sheet 2, and on top of these assembled layers there is placed a sheet 5 of gold or such other precious metal as is to be used for the plating operation. The thickness of the precious metal sheet will depend on the quality of the plate desired, and, in the illustrative example, might vary from .01 to .25 of an inch or might even be outside of these limits. The assembled parts are then clamped together or otherwise placed under pressure in a soldering furnace and fused together, making a blank in the form of the composite block faced with the precious metal sheet, and an interposed sheet of relatively hard, acid resisting material between the precious metal sheet and the relatively soft and cheaper base metal.

If desired, the acid resisting sheet 3 might be first assembled and fused to the base metal block and the resulting composite block then assembled with the precious metal and the latter fused thereto, or the acid resisting metal and precious metal might first be assembled and united and then united to the base metal.

The composite block is then subjected to the usual mechanical operations heretofore practised, such, for example, as a succession of rolling actions, to produce thin plated metal sheets, or a drawing process or a combination of rolling and drawing to produce seamless wires, rods or tubes.

If it is desired to produce a very cheap form of plate the composite block as described may be rolled to a certain degree of thinness and then cut into smaller portions which may be fused each to another block of base metal and the latter each subjected to further mechanical thinning operations. Or, on the other hand, if desired, the base of the plate instead of consisting of the cheap base metal 1 and the acid resisting metal 3 might consist entirely of the acid resisting metal.

By the use of this composite material in the rolling or drawing operation, the gold or other precious metal may be reduced to an excessive thinness without bringing to the surface any of the base metal. Where the precious metal is backed by a hard, tenacious body, it is capable of being rolled or worked without separation or breaking into a thinner film than otherwise, so that an unbroken film may be preserved to a more advanced point in the thinning operation than otherwise. If there be any separation of the particles of precious metal on the surface, or any excessive thinness of the precious metal film, the acid resisting layer tends to preserve the durability of the surface and its resistance to deterioration.

Through the presence of the acid resisting backing the particles of the base metal are prevented from working to the surface of the plate so that a relatively cheap plate may be produced having a durability and wear resisting qualities exceeding those heretofore possessed by the same grade of plate. Such plate is capable of withstanding without effervescence the usual acid tests which consist in applying to the surface of the plate so-called thirty-six Baumé degree nitric acid.

The same principle may be obviously applied to the production of double-plated material, that is to say, where the plated ware presents a plated surface on both its opposite sides, each surface having an acid resisting backing.

While I have herein shown and described for the purposes of illustration one specific embodiment of the invention, it is to be understood that the same is not limited to the details thereof but that extensive deviations may be made therefrom without departing from the spirit thereof.

Claims:

1. A composite plated metal product having a finely attenuated surface of precious metal, a thin backing of relatively hard, tenacious metal capable of resisting dilute nitric acid, and a relatively thick base of metal relatively soft as compared with the backing and relatively cheap as compared with the surface.

2. A composite plated metal product having a thin surface of precious metal, a relatively cheap and relatively thick metal base, and a backing comprising a nickel chromium product relatively thin as compared to the base between the precious metal and the base.

3. A composite plated product consisting of a thin surface of precious metal and a backing of an alloy including in its composition iron, nickel and chromium.

4. A composite metal blank for producing a metal plated product comprising a body of relatively cheap base metal, a backing sheet of dilute nitric-acid-resisting metal united thereto, and a surface sheet of precious metal united to the backing sheet the latter being relatively hard and tenacious as compared with both the base and precious metal.

5. A composite metal blank for producing

a plated product comprising a backing sheet of dilute nitric-acid-resisting metal united to a surface sheet of precious metal, the former comprising an alloy of iron, nickel and chromium.

6. The method of producing a plated product which consists in soldering a sheet of precious metal to a backing sheet of relatively hard, tenacious metal and the latter to a base metal relatively cheap as compared with the surface and relatively soft as compared with the backing, and subjecting the same to a succession of rolling operations to reduce the thickness of the composite product and the precious metal to a finely attenuated coating backed by the hard, tenacious metal.

7. A composite metal product having a thin surface of precious metal, a relatively cheap and thick metal base, and a backing comprising a nickel product relatively thin as compared to the base between the precious metal and the base.

In testimony whereof, I have signed my name to this specification.

VICTOR D. DAVIGNON.