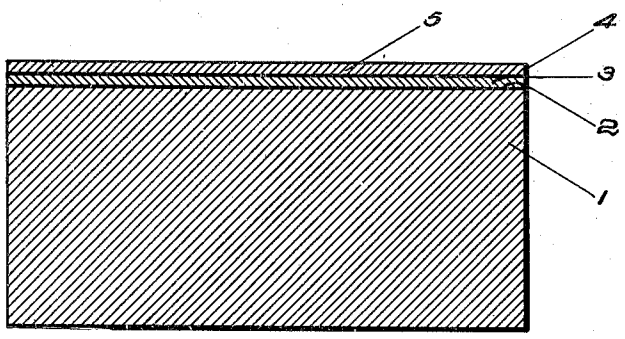
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V. D. DAVIGNON

PLATED METAL

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PLATED METAL.

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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, 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 consists in improvements in that class of plated product which comprises a backing or base of relatively cheap metal, surfaced 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 cheap base metal, such, for example, as brass, 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 in a unitary piece, such process being carried to a point where the precious metal is left as a thin surface coating on the usual relatively thick base metal body.

In the production of the more inexpensive grades of plated ware, the mechanical attenuation is carried to the point where the surface coating is reduced to a very thin film and, if carried far enough, where the particles of the base metal tend to co-mingle at points in the surface with particles of the precious metal. This is apparently due in part to the working of the precious metal into the underlying soft base metal so that the continuity of the precious metal is broken at intervals and becomes replaced at the surface by particles of the base metal. It also appears to be due to the fact that the solder, when fused, tends to soften and draw into its mass more or less of both the precious metal and the base metal and cause them to co-mingle, the rolling action tending to further co-mingle the two metals and draw the base metal to the surface. Between successive rolling actions, it is necessary to subject the product to a high annealing temperature which again gives opportunity for this co-mingling action, and this effect is further aggravated by the subsequent rolling process.

In the production of inexpensive gold or other precious metal rolled plate, the point is soon reached where the product is subject to discoloration or oxidization due to the effect of exposure of the base metal particles on the precious metal 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 the jewelry manufacture or other similar purposes.

The present invention contemplates the production of mechanical processes similar to those heretofore employed of a plated metal 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, the 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 the block 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 metal sufficiently malleable to respond to the rolling process, but relatively hard as compared to the base metal so as to present a hard, tenacious backing on which the precious metal may be effectively rolled. Such metal should also be capable of withstanding high temperatures, such, for example, as 1250° F., which approximates those customarily employed in the soldering furnace and the annealing ovens, and of so separating the base metal from the previous metal under such conditions that the fusion of the solder can have no tendency to cause particles of the precious metal to co-mingle with the metal of either the base or the backing. I have found that a suitable metal for this purpose is ordinary machine steel. This has sufficient malleability to undergo the rolling operations without damage to the product and sufficient hardness to permit the precious metal to be rolled out into a thinner unbroken film than has heretofore been practically obtainable. The best results may be had by using cold rolled steel.

The sheets 3 of backing metal may be of any desired thickness, but in the illustrative example a sheet .010 to .014 of an inch thick will suffice. On the top of the backing sheet 3 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 the soldering furnace and fused together, making a blank in the form of a composite block composed of the base metal, the precious metal sheet and an interposed sheet of relatively hard but malleable and heat resisting metal.

If desired, the backing 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 backing sheet and precious metal might first be assembled and united and then together united to the base metal.

The composite block is then subjected to the usual mechanical operation heretofore practised, such, for example, as a succession of rolling actions, to produce thin 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 operation. Or, on the other hand, if desired, the base of the plate, instead of consisting of the cheap metal base 1 and the backing 3, might consist entirely of machine steel.

In the use of this composite material in the rolling or drawing operation, the gold or other precious metal may be reduced to an unusual thinness without disruption of its continuity. The base metal is prevented by the steel backing from co-mingling with the precious metal, either through the action of mechanical attenuation or through the agency of the fused solder. The backing is not only too hard and dense to work into and through the precious metal coating, but offering, as it does, a hard, smooth and dense surface over which precious metal is worked, as by rolling, the latter may be carried to a more advanced point than heretofore while still maintaining an unbroken film of the precious metal.

A relatively cheap plate may thus be produced having durability and wear resisting qualities heretofore possessed only by higher grades of plate. Such plate is capable to withstanding without effervescence the usual acid test which consists in applying to the plate so-called 36 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 hereof but that extensive deviations may be made therefrom without departing from the spirit thereof.

I claim:

1. A composite plated metal having a finely attenuated surface of precious metal, a thin backing of steel, 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 having a finely attenuated surface of precious metal, a thin backing of malleable steel, and a

relatively thick base of metal relatively soft as compared with the backing and relatively cheap as compared with the surface.

3. A composite metal blank for producing a plated product comprising a relatively thick body of relatively cheap base metal, a backing sheet of steel united thereto, and a surface sheet of precious metal united to the backing sheet.

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

VICTOR D. DAVIGNON.