

# UNITED STATES PATENT OFFICE.

SHERARD OSBORN COWPER-COLES, OF LONDON, ENGLAND.

## PROCESS OF INLAYING, ORNAMENTING, AND CASE-HARDENING METALLIC SURFACES.

No. 911,116.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, SHERARD OSBORN COWPER-COLES, a subject of the King of Great Britain, residing at Grosvenor Mansions, Victoria street, Westminster, London, England, have invented a new and useful Improved Process for Inlaying, Ornamenting, and Case-Hardening Metallic Surfaces; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved process for inlaying, ornamenting and case-hardening metallic surfaces and for coating one metal with another.

It has heretofore been the practice when inlaying or onlaying one metal with another to cut grooves or recesses in the surfaces into which the metal is beaten or forced or to provide grooves into which the molten metal is run.

Now, according to my invention I expose the metallic surface, or such parts thereof as are to be coated, to an atmosphere of the vapor of the metal which is to be deposited thereon, the said volatilized metal combining with and condensing on the metallic surface on coming into contact therewith and forming the required coating.

In carrying out my invention as applied to the ornamentation of a metal article I advantageously proceed as follows, that is to say, I coat the article to be ornamented with a composition such, for example, as whiting mixed with a solution of an adhesive substance such as treacle or molasses which I have found to give good results. After the article has been evenly coated with the composition the desired pattern or design is traced on the latter and those portions which are to be inlaid or onlaid are cut out. The article may then be subjected to the action of a sand-blast, although in many cases this is not essential, in order to insure a clean metallic surface to those parts which are to be inlaid. The article is then introduced into a closed vessel which is connected with a crucible containing molten zinc, cadmium or other metal to be inlaid and which will volatilize at a comparatively low temperature and condense on the article suspended in proximity to it. Hydrogen gas is passed

through or over the molten metal to facilitate the operation. The zinc or other metal is preferably heated in an electric furnace either of the induced current or resistance type. To case-harden a metal I proceed in a similar manner, that is to say, supposing it be desired to give a hard coat or skin to say, copper, I suspend the copper article in the metallic vapor and directly it is withdrawn from the closed vessel I immerse it in cold water instead of allowing it to cool gradually.

When coating iron articles with zinc or any other suitable metals for protective purposes, the iron is freed from rust and scale by any of the well-known methods such as pickling or sand-blasting and the articles are then placed in a chamber into which the metallic vapor is passed, or, if the articles are of a suitable shape, in a revolving cage or drum.

It will be obvious from the foregoing description that my process can be applied in general to the coating of one metal with another for a large variety of purposes.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. The method of ornamenting, case-hardening or coating metallic surfaces consisting in exposing the surface to an atmosphere of the vapor of the metal to be alloyed or deposited thereon said metal being in a molten state and passing hydrogen gas through or over the molten metal, substantially as hereinbefore described.

2. The process of ornamenting, coating or onlaying of metallic surfaces, which consists in coating the surface to be ornamented with an adhesive composition, tracing the pattern or design upon said composition, then removing the adhesive coating from the portions of the metal that are to be coated to form the design, then exposing the metal so prepared to the vapor of the metal to be deposited and passing hydrogen gas over or through the vaporizing metal, substantially as described.

3. The process of ornamenting, coating or onlaying of metallic surfaces which consists in coating the surface to be ornamented with an adhesive composition, tracing the pattern or design upon said composition, then removing the adhesive coating from the portions of the metal that are to be coated to form the de-

sign, then cleaning the exposed metal surface, then exposing the metal so prepared to the vapor of the metal to be deposited and passing hydrogen gas over or through the vaporizing metal, substantially as described.

5 4. The method of coating a metal surface consisting in subjecting it to the action of a

metallic vapor in the presence of a reducing agent while out of contact with the metal supplying the vapor, substantially as described. 10

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Witnesses:

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