

# UNITED STATES PATENT OFFICE.

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TENNESSEE.

## IMPROVEMENT IN PHOTO-ENGRAVING ON METALS.

Specification forming part of Letters Patent No. 124,905, dated March 26, 1872; antedated March 19, 1872.

*To all whom it may concern:*

Be it known that we, WILLIAM A. MCGILL and ROBERT G. PINE, of Memphis, in the county of Shelby and State of Tennessee, have invented a new Process for Photographic Engraving on Metals and other substances; and we do hereby declare that the following is a full, clear, and exact description thereof.

The object of this invention is to produce from a photograph, on metal or other surface, an engraving by a process of etching, as will be hereinafter explained.

We take, as a base of operation, a pure silver surface or an alloy, and, after finely polishing or frosting it, it is subjected to the action of iodine, and a film of the iodide of silver is formed on the plate. We then expose the plate to the action of light in the *camera obscura*, or under a photographic negative, until a faint image of the object is formed. The plate is then submitted to the action of an electrotype-battery, (copper solution,) when a well-defined image of the object in copper is formed, the cupreous deposit attaching itself only to those parts of the plate which were rendered conductors of electricity by the action of light, while the unexposed parts will remain non-conductors of electricity. The plate is now dried and etching solution poured on it, composed of sulphuric acid saturated with nitrate of potash or their equivalents. This solution immediately attacks the shadows or exposed portions of silver surface, while the cupreous deposit from the electrotype-bath is not affected. After etching the required

depth the copper deposit on the plate may be readily removed by *aqua regia*, which will not act on the silver plate, leaving a finely-etched image in the silver plate.

To engrave or etch on steel, gold, copper, and other substances, the surfaces are first coated with pure silver. We then proceed substantially as above explained, with the exception that different acids or combinations of acids are used on the various metals or other substances after the silver plating or surface is etched through, according to the nature of the base to be operated upon—for instance, in etching on gold, after the silver is etched through with the saturated solution of sulphuric acid and nitrate of potash, we use *aqua regia* or nitro-muriatic acid, which acts on the gold, but leaves the silver intact.

In carrying our invention into effect we shall apply it to the ornamentation of silver plate and jewelry, and also other purposes for which it is found applicable.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

The process, substantially as herein set forth, for producing engravings on metallic and other surfaces.

WILLIAM ALPHONSO MCGILL.  
ROBERT GRANVILLE PINE.

Witnesses:

ROBERT B. MILLER,  
DANL. S. STAILY,  
W. KIMBLE,  
GEORGE PINE.