UNITED STATES PATENT OFFICE.

ALEXANDER E. OUTERBRIDGE, JR., OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN THE MANUFACTURE OF METALLIC LEAF.

Specification forming part of Letters Patent No. **198,209**, dated December 18, 1877; application filed October 3, 1877.

To all whom it may concern:

Be it known that I, ALEXANDER E. OUTERBRIDGE, Jr., of Philadelphia, in the county of Philadelphia, State of Pennsylvania, have invented a new and Improved Method and Process of Manufacturing Gold-Leaf, Silver-Leaf, and other Metallic Leaf; and I do declare that the following is a full and exact description thereof.

The ordinary process of manufacturing gold-leaf is entirely mechanical, being effected by beating pieces of rolled gold ribbon between sheets of vellum, or of prepared paper, and gold-beaters' skins, which, after successive processes of annealing and rebeating, produces the thin film known as "gold-leaf."

Silver-leaf is produced in an analogous manner.

The object of my invention is to prepare gold and silver and other metal leaf by means of galvanic or electrical deposition of a film of the metal upon a suitable substance, and the subsequent removal of such substance by heat or solvents, whereby the film is released.

To enable others to use my invention, I proceed to describe it in detail as follows:

By the ordinary process of electroplating, I deposit a coating or film of metal, of the desired thinness to constitute the leaf, upon an extended smooth conducting-surface as a vehicle to receive the same, which vehicle is capable of being subsequently removed by chemicals, heat, or by any other similar means which will not affect the film plated thereon.

The substances which I have found preferable for use as vehicles are copper in thin sheets, metal fusible at a low temperature, shellac, wax, or paper. When the vehicle used is not itself a conductor of electricity, it is necessary to coat one side with bronze-powder, or other equivalent conducting-surface, upon which the film of metal can be deposited. I then remove the substance upon which such film has been plated by heat or any suitable solvent, which is capable of removing it without affecting the film plated thereon.

In the case of a gold film plated upon one side of a sheet of copper, I usually float it, copper side downward, upon a bath of dilute nitric acid or of perchloride of iron. This gradually dissolves the copper and leaves the gold-leaf intact, floating on the surface of the liquid. I then lift it upon a sheet of glass, paper, or other suitable material, and float it upon the surface of water, which removes all trace of the acid. The leaf is then lifted from the water in a similar manner, dried, and packed in books between sheets of prepared paper, or in any suitable manner.

In the case of gold films plated upon sheets of paper, shellac, wax, &c., prepared with a surface capable of conducting electricity, I proceed in a similar manner, using for paper the bath of dilute nitric acid or perchloride of iron, which soaks through the paper and dissolves the bronze-powder coating, thus freeing the film, and for the sheets of shellac, wax, &c., using alcohol, benzine, or any other equivalent solvent.

In the case of gold films plated upon metal fusible at a low temperature, I apply heat sufficient to liquefy such metal, thereby enabling me to remove the gold film freed from the metal upon which it was plated.

In the case of wax, or other substance which may be either dissolved by chemicals or easily melted by heat, I sometimes use one method and sometimes the other.

In the case of films of silver or other metal, I proceed in an analogous manner, using one or other of the above-mentioned substances upon which to plate such films, and using the appropriate method, above referred to, to remove such substance, taking care that the solvent employed for that purpose be one which will not injuriously affect the film. The leaf may then be annealed in the ordinary manner, if desired.

The advantages of my new process over the old method are, first, the easy practicability of producing films of any desired superfices, shape, and degree of thinness, even thinner than such leaf can be prepared by the old method; second, the superior quality of the metallic film or leaf produced in fineness, strength, and homogeneity of texture, and uniformity of thickness; third, the comparative rapidity of production, saving of waste and simplicity of action, thereby avoiding, in a great measure, the necessity for skilled manual labor, and enabling its preparation at a

reduced cost; fourth, by burnishing or giving a high polish to the surface on which the film is to be deposited, the leaf can be produced with an equally bright surface.

Having thus described my invention, I do not claim the process of electroplating; nor do I claim the method of solving or melting the substances upon which the film is plated; nor do I claim the process commonly known as "electrotyping;" but

What I claim as new, and desire to secure by Letters Patent, is—

The process of obtaining metallic leaf by electro-deposition of a film of metal upon a suitable vehicle, and the subsequent removal of such vehicle by heat, solvents, or other similar means which do not injure the film, substantially as set forth.

ALEXANDER E. OUTERBRIDGE, JR.

Witnesses:
THOMAS ROBINS, 3d,
F. F. HALLOWELL.