

# United States Patent Office.

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RUSSIA, ASSIGNORS TO GREEN, CLAY, AND COMPANY.

*Letters Patent No. 82,525, dated September 29, 1868.*

## IMPROVED GALVANO-PLASTIC PROCESS FOR PRECIPITATING IRON ON MOULDS, &c.

The Schedule referred to in these Letters Patent and making part of the same.

### TO ALL WHOM IT MAY CONCERN:

Be it known that we, MAURICE HERRMANN JACOBI and EUGENE KLEIN, of St. Petersburg, in Russia, have invented a new and useful Improvement in Galvano-Plastic Process for Precipitating Iron on Moulds, &c.; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

Our invention consists in the application of a practical galvano-plastic process as to the deposits of iron on moulds, or any other form, for reproducing engravings, stereotypes, and for other useful or ornamental purposes.

The galvano-plastic bath we use is composed of sulphate of iron, combined with the sulphates of either ammonia, potash or soda, which form, with sulphate of iron, analogous double salts.

The sulphate of iron may also be used, in combination with the chlorides of the said alkalies, but we still prefer the use of sulphates.

The bath should be kept as neutral as possible, though a small quantity of a weak organic acid may be added, in order to prevent the precipitation of salts of peroxide of iron.

A small quantity of gelatine will improve the texture of the iron deposit.

As in all galvano-plastic processes, the elevation of the temperature of the bath contributes to the uniformity of the deposit of iron, and accelerates its formation.

For keeping up the concentration of the bath, we use, as anodes, large iron plates, or bundles of wire of the same metal.

Having observed that the spontaneous dissolution of the iron anode is, in some cases, insufficient to restore to the bath all the iron deposited on the cathode, we found it useful to combine the iron anode with a plate of gas-coal, copper, platinum, or any other metal being electro-negative towards iron, and which we place in the bath itself.

As a matter of course, this negative plate may also be placed in a separate porous cell, filled with an exciting fluid, as diluted nitric or sulphuric acid, or the nitrates or sulphates of potash and soda.

For producing the current, we usually take no more than one or two cells of Daniells' or Smee's battery, the size of which is proportioned to the surface of the cathode.

It is indispensable that the current should be regulated, and kept always uniform, with the assistance of a galvanometer, having but few coils, and therefore offering only a small resistance.

The intensity of the current ought to be such as to admit only of a feeble evolution of gas-bubbles at the cathode, but it would become prejudicial to the beauty of the deposit if gas-bubbles were allowed to adhere to its surface.

The same moulds, as employed for depositing copper, may also be used for depositing iron, only it is advisable, in employing moulds made of lead or gutta percha, to cover them previously with quite a thin film of galvanic copper, formed, in a few minutes, in the usual way, and then bring them, after having washed the moulds with water, immediately in the iron-bath.

This film of copper may be removed from the deposit either by mechanical means, or by immersion into strong nitric acid.

The deposited iron is very hard, and rather brittle, so that some precaution must be taken in separating it from the mould. By heating, it acquires the malleability and softness of tempered steel.

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

The process of precipitating iron on moulds, in the manner substantially as and for the purposes herein set forth.

MAURICE HERRMANN JACOBI.  
EUGENE KLEIN.

Witnesses:

JOSEPH LINDSEY,  
VICTOR HAGMANN.