UNITED STATES PATENT OFFICE.

ELLIOT SAVAGE, OF WEST MERIDEN, CONNECTICUT.

IMPROVEMENT IN PLATING IRON AND STEEL.

Specification forming part of Letters Patent No. **51,754**, dated December 26, 1865.

To all whom it may concern:

Be it known that I, ELLIOT SAVAGE, of West Meriden, New Haven county, Connecticut, have invented certain new and useful Improvements in Electroplating upon Iron and Steel; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention is an improved method of obtaining the first film or deposit upon the surface of the iron or steel of the metal desired, as silver, copper, gold, &c.

Hitherto it has been found necessary to polish the surface of the iron or steel, then to wash it with alkalies in order to remove all traces of grease or oil, and finally finish with a brush, carefully avoiding even the touch of the fingers upon the polished surface. This is then quickly introduced into a galvanic bath having a powerful battery. In a short time it can be taken out, there being then a film of metal deposited upon it. If, however, the cleaning had not been perfect, there will be spots or discolorations upon the deposit, and these are apt to appear on the finished article after it has received the thicker plating in the subsequent weak battery. Sometimes, too, the plating can be readily peeled off.

I will now describe the manner in which I carry out my improvement as applied to the plating of steel with silver. I first polish the surface of the steel, but do not care to remove the grease nor to avoid touching the polished surface with the fingers. I then have ready a crucible or other suitable vessel adapted to the size of the steel and containing melted cyanide of potassium heated to a temperature of, say, 500° or 600° Fahrenheit. The steel is then to be plunged into this and allowed to remain until it has acquired the temperature of the bath. It is then, while hot, removed to a bath containing a nearly saturated solution of cyanide of potassium in water, to which is added a salt of silver—as the chloride of silver—sufficient to make a strength of about 10° Baumé. As soon as cool the steel may be removed, and will be found to be perfectly coated with a film of silver without spots or discolorations. The further deposit of silver is to be effected in the ordinary manner. In my process the steel, when taken from the bath of melted cyanide, has enough of that adhering to it to preserve the steel from the action of the oxygen during transmission to the cooling-bath. There the adhering portion is dissolved off by the solution, and as the steel is hot the first particles of silver deposited penetrate the pores of the steel, forming at the surface an actual alloy, and hence the plating will not peel off.

If it is desired to harden the steel as well as to plate it, this will be effected by raising the temperature of the melted cyanide before the steel is plunged into it to the desired point. A temperature of, say, 800° Fahrenheit will give an extreme hardness, when the steel is afterward plunged into the cooling-bath above described.

It will be obvious that other metals may also be plated upon steel or iron, it being only necessary to substitute for the salt of silver in the cooling-bath a salt of the metal to be deposited.

I prefer the haloid salts of the metals for the cooling-bath, as those contain no acid; but the oxysalts may be employed if the acid be neutralized.

I claim—

The process for electroplating upon iron and steel, substantially as herein set forth.

ELLIOT SAVAGE.

Witnesses:

J. P. PIRSSON,

S. H. MAYNARD.