UNITED STATES PATENT OFFICE.

QUINTIN MARINO, OF HENDON, ENGLAND.

ELECTROLYTIC METHOD OF CLEANING IRON AND STEEL.

1,324,317. Specification of Letters Patent. Patented Dec. 9, 1919.

No Drawing. Application filed August 11, 1919. Serial No. 316,779.

To all whom it may concern.

Be it known that I, QUINTIN MARINO, a subject of the King of Italy, and a resident of Hendon, county of Middlesex, England, have invented a certain new and useful Improvement in Electrolytic Methods of Cleaning Iron and Steel, of which the following is a specification.

My invention relates to a process for an electrolytic method of cleaning iron and steel.

The method of removing scale or rust from iron or steel hitherto usually adopted, has been to immerse the article to be cleaned in dilute hydrochloric or sulfuric acid. This method is defective in that the iron or steel article is also attacked.

According to my invention, I remove the scale or rust by an electrolytic method which accomplishes the desired object in much quicker time than the ordinary acid method, and does not injure the iron or steel.

The electrolyte I employ is a solution of a sulfate and a fluorid of, say, about 20 to 25 Baumé strength generally in the proportion of one part of fluorid to three parts of sulfate. The sulfate employed is preferably any one or more of the sulfates of aluminium, magnesium, sodium, or potassium; and the fluorid may be any one or more of the soluble fluorids of magnesium, sodium or potassium, or even hydrofluoric acid may be substituted for the metallic fluorid, but I prefer the metallic fluorid. It will be obvious that neither a sulfate nor a fluorid of any metal which would be liberated by the current should be employed. Broadly speaking, the deeper the coating of rust or scale to be removed, the greater should be the proportion of fluorid employed, but I do not at any time use more fluorid than I do sulfate.

The current density required depends on the quantity of scale or rust to be removed but I have found a current density of from 10 to 30 amperes per square foot to be a convenient current to employ. If it is desired to diminish the time required to carry out the operation, the conductivity of the electrolyte may be increased by employing a larger proportion of fluorid than would otherwise be used, or by adding commercial hydrofluoric acid equal in amount to from 5 to 20 per cent. by volume of the electrolyte. The temperature of the electrolytic bath should always be raised to 150 degrees or 180 degrees Fahrenheit. I have found it possible to work with a current density up to 100 amperes per square foot.

The iron or steel article to be cleaned is made the cathode and the anode may be carbon or lead. The most suitable vats or tanks for carrying out the process are those made of wood, or wood lined with lead.

I claim:—

1. An electrolytic method for removing scale or rust from iron or steel which consists in making the iron to be cleaned a cathode of the electrolytic circuit, and immersing the same in an electrolytic bath consisting of a solution of soluble sulfate and a soluble fluorid.

2. An electrolytic method for removing scale or rust from iron or steel which consists in making the iron to be cleaned a cathode of the electrolytic circuit, and immersing the same in an electrolytic bath consisting of a solution containing a soluble sulfate and a soluble fluorid in the proportion of three to one.

In testimony whereof I have affixed my signature hereto this 18th day of July, 1919.

QUINTIN MARINO.