

UNITED STATES PATENT OFFICE.

ALEXANDER S. RAMAGE, OF CLEVELAND, OHIO, ASSIGNOR TO JOSEPH C. GILCHRIST, OF SAME PLACE.

PROCESS OF TINNING OR GALVANIZING METALS.

SPECIFICATION forming part of Letters Patent No. 567,612, dated September 15, 1896.

Application filed November 4, 1895. Serial No. 567,927. (No specimens.)

To all whom it may concern:

Be it known that I, ALEXANDER S. RAMAGE, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and
5 useful Improvements in Processes of Tinning or Galvanizing Metals; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it
10 pertains to make and use the same.

The invention relates to a process of tinning or galvanizing metals; and it consists in cleaning off the scales and redepositing a layer of pure iron by electrolysis to produce
15 the desired surface for depositing the tin.

In particular the invention consists in first subjecting the plates to the action of electrolysis in a bath containing salts of iron and ammonium or sodium salts, in which step the
20 scales are removed and a smooth surface produced. In order to prevent loss of metal, I may and prefer to reverse the polarity of the plates and redeposit upon the plates so cleaned an amount of metal substantially the
25 same as was taken off in the scales to maintain the same thickness and without loss of metal. When thus prepared, I subject my plates to the usual tinning or galvanizing process.

The main object of this invention is to so
30 prepare the metals that the use of acids commonly employed may be dispensed with. In the present state of the art it has been found necessary to pickle the metals to obtain the proper results, and in this manner of preparation the metals have been subjected to the
35 action of acids, which resulted in a loss of the metals so treated. My improvement is designed to overcome these objectionable features and is adapted for the treatment of
40 metals generally. I will, however, describe the process in its relation to iron, whence its other uses will be obvious after such description.

The manner in which I prefer to carry out
45 my process is as follows: The iron which is to be treated is preferably cut into the form of plates and immersed in a tank or bath containing a solution of salt of iron in combination with ammonium or sodium salts. The
50 plate which is to be treated is made the anode

of the bath by coupling the same with the positive pole of a dynamo capable of giving a current with a pressure of from two to three volts between the anode and cathode. The cathode or negative pole is a simple plate of
55 iron which is connected with the negative pole of the dynamo. Between the dynamo and the tank is placed a switch so constructed that it is capable of reversing the current to the opposite poles. The current is now passed
60 through the plates for a short interval, depending upon the strength of the current, which causes, by electrolysis, the scales on the anode-plate to partially dissolve. The
65 plate being thus cleaned the current is reversed, the anode-plate becomes a cathode, and the iron which is collected upon the former negative plate is now coated over the metal, which upon the reversal of the current be-
70 comes the negative plate. As soon as the plates of iron are thoroughly coated they are drawn from the bath and the current reversed, fresh plates added, and the operation is repeated. The plates as they come from the
75 bath, with a fine coating of iron finely distributed over their surfaces, can be tinned or galvanized by the usual method.

I am aware it is old to coat iron with iron preparatory to coating with some other metal and that electrolysis has been employed to
80 clean iron plates. By means of my improvement, however, I am enabled to use the iron removed from the plate and by one process redeposit the same iron in a pure state, thus restoring the plate to its original thickness
85 and also preparing it for coating.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The herein-described process of tinning
90 or galvanizing metals which consists in immersing the metal in a suitable electrolyte, making said metal the anode of the electrolytic cell, removing the scale and depositing the pure metal contained therein on the cath-
95 ode by electrolysis, reversing the polarity of the electrodes and redepositing pure metal upon the said metal being treated and finally tinning or galvanizing the prepared metal,
100 substantially as and for the purpose set forth.

2. The herein-described method of tinning
or galvanizing which consists in subjecting
the iron plates to a bath containing salts of
iron and sodium or ammonium salts making
5 said iron the anode in the process of electrol-
ysis whereby the scale is removed and the
pure iron contained therein deposited upon
the cathode, then reversing the polarity of
the electrodes and redepositing said pure iron

on the plates and finally tinning or galvan- 10
izing said plates.

In testimony whereof I sign this specifica-
tion, in the presence of two witnesses, this 10th
day of September, 1895.

ALEXANDER S. RAMAGE.

Witnesses:

L. WARD HOOVER,
ELLA E. TILDEN.