

UNITED STATES PATENT OFFICE.

CHAUNCEY E. ROBINSON AND WILLIAM L. SUTHERLAND, OF CONNELLSVILLE, PENNSYLVANIA.

PROCESS OF PICKLING PLATES, BARS, OR SHEETS OF METAL.

SPECIFICATION forming part of Letters Patent No. 650,095, dated May 22, 1900.

Application filed July 17, 1899. Serial No. 724,078. (No specimens.)

To all whom it may concern:

Be it known that we, CHAUNCEY E. ROBINSON and WILLIAM L. SUTHERLAND, citizens of the United States of America, residing at Connellsville, in the county of Fayette and State of Pennsylvania, have invented certain new and useful Improvements in Processes of Pickling Plates, Bars, or Sheets of Metal; and we do hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to an improved process of pickling bars, sheets, plates, or other metallic articles requiring the scale or oxid removed therefrom for the purpose of tinning, plating, polishing, &c.; and it consists in the preparation of a bath composed of acid, water, and a suitable starchy substance in solution and in certain proportions and of the treatment and preparation of the said materials prior to their mixture, together with the manner in which the said plates, bars, &c., are treated prior to and after the bath, as will be fully described hereinafter.

In the manufacture of tin plates the pickling process is analogous with that of bars, sheets, or plates, and in the tinning of the sheets there is what is known in the art as "patches" or "menders," which are caused, first, from particles of foreign matter rolled into the plate during the process of cold-rolling or pressed into the plate during the tinning operation; second, from acid not being thoroughly rinsed from the plates, causing green spots, and from many other causes that finally produce a defective plate, principally due to the improper and inferior pickling solution and process, these defective plates causing large losses in material, time, and labor, and in the different mills or manufacturing of tin-plate this loss varies from eight to fifty-one per cent. and of menders alone from four to fifteen per cent.

The ordinary manner in which the defective parts or blemishes are removed from menders and render them marketable is by scouring or scraping the particles by means of proper tools, rendering the work tedious and adding considerable additional expense to the finished article. By the use of our process these defective plates or menders are treated to a weak bath of the solution and at

a higher temperature, which will remove all such patches or green spots and completely cleanse the plate of all grease and enable the acid to remove the oxid more readily.

In the manufacture of tin-plate in accordance with our improved process we form a solution consisting of from three-fifths to one and one-fourth pounds of sulfuric acid or muriatic acid to each gallon of water, brought to a temperature of from 60° to 125° Fahrenheit, and by adding to the said water and acid a solution consisting of one-fourth of a pound of wheat-bran middlings to each gallon of water or other substance that will produce a starchy material and water in the same proportions and mix the same in about equal proportions with the diluted acid. This starchy solution consists of about one-quarter of a pound of bran or middlings to a gallon of water thoroughly steamed for a period of from one to two hours or sufficient time to extract the starchy substance contained therein. This product is thoroughly strained to remove all foreign matter and render the liquid pure. The object of this solution of starchy substance is to preserve the surface of the sheets after once cleaned of all scale, as the said substance will adhere to the plate and protect the clean surface from contact with any particles of dirt and also from the atmosphere.

The plates, sheets, or bars are placed in a suitable rack or cradle and placed in the pickle or bath above described and permitted to remain therein for from five to twenty minutes, according to the strength of the acid solution, and then removed and thoroughly rinsed in a tank of pure cold water.

As the acid solution loses strength from continuous use, the temperature is increased to a high degree and kept at this point until all matters which have been removed from the plates or menders—such as scales, dirt, acid, &c.—are upon the top of the solution. As such substance is lighter than the solution, it will rise through the same to the top in the form of a dark foam. This dark foam is then ignited by a torch and permitted to burn from one to three minutes, or a sufficient time to consume the same, leaving the acid perfectly clear and free from dirt. Then add

some acid and starchy substance to bring the solution to its former strength.

By the use of this improved process the expense is reduced by the saving of acid, time, and labor and the waste reduced to as low as one and four-tenths per cent. and menders in the same proportion.

Having thus described our invention, we claim—

10 The herein-described process for pickling plates, bars, or sheets of metal, consisting of treating the same to a bath composed of a so-

lution of muriatic acid and water at a temperature from 60° to 125° Fahrenheit and a starchy substance whereby a coating is given 15 the article to preserve the cleansed surface.

In testimony whereof we have hereunto affixed our signatures in the presence of two subscribing witnesses.

CHAUNCEY E. ROBINSON.

WILLIAM L. SUTHERLAND.

Witnesses:

W. L. ROBBINS,

WM. S. YARD.