

United States Patent Office.

JOHN D. GRÜNEBERG AND SAMUEL H. GILBERT, OF SPRING MILLS, NEW JERSEY.

Letters Patent No. 75,898, dated March 24, 1868.

IMPROVEMENT IN COATING METALS.

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, JOHN D. GRÜNEBERG and SAMUEL H. GILBERT, both of Spring Mills, in the county of Camden, and State of New Jersey, have invented a new and useful Improvement in Articles of Metal; and we do hereby declare the following to be a clear and exact description of the nature thereof, sufficient to enable others skilled in the art to which our invention appertains to fully understand and use the same.

Hitherto it has been customary to cover sheet iron and copper, and probably other hard metals, with tin or alloys, by "dipping" the former in acid, and then in a solution of the tin or alloy. The disadvantage of this process is that only small sheets of metal can thus be coated or plated, because, in preparing large sheets, it was found that a considerable portion of the surplus covering or plating would harden before it had run off from the lower end of the sheets, so that only part of said sheets would possess the proper thickness or surface.

Our invention is specially intended to remedy this. We have found that long or large sheets of metal can be uniformly coated or plated in a simple manner, so that an article of metal is produced which possesses all the advantages of pure tin, and at a much less expense.

If the sheets of tin or alloy are spread or laid upon sheets of hard metal so as to entirely overlap them, and the two sheets be subjected to rolling under a heavy pressure, the friction thereby will heat the metals in passing through the rolls, and cause them to unite firmly and with a uniform surface, so as to produce a superior article of metal.

In carrying out our invention, we take blocks or sheets of any of the aforementioned hard metals, and roll them, in a cold or heated state, until they assume a certain thickness. We then make an alloy of either of the following:

One quarter tin, one quarter copper, and one half lead, more or less; or six parts tin, one, antimony; or fifty parts tin, four, antimony, one, bismuth; or fourteen parts tin, one twenty-eighth part zinc or copper, or one half of each of the latter ones; or pure tin, alloyed with as much of one of the above-named metals, or any other metal which will give it more stiffness and durability than it has in its natural state; or we use pure tin itself.

A block of the tin, or tin or other alloy, is now cast in a mould of suitable size, which block is then passed through highly-polished rollers, so as to be reduced to a proper thickness to answer the purpose of common plating. The thickness may vary from one to thirty-five per cent. of the original thickness of the block or sheet of hard metal selected.

The strips thus produced are then severally spread or laid upon a smooth, level table. One of the aforementioned blocks or sheets of hard metal is now laid upon one of the strips of tin or alloy, which strip is then lapped over the former, so as to entirely cover it. Care must be taken to rub it smoothly, in order to prevent the formation of air-blisters or wrinkles. The compound sheet or block thus constituted is now passed between highly-polished rollers under heavy pressure, whereby the metals become quite hot in passing through, thus causing them to firmly unite, and evenly, in one solid sheet, having either the tin or alloy, or other metal, for the outer coating.

Instead of the above process, we prepare a solution of one pound of muriate or nitrate of tin, and ten gallons (or eighty pounds) water, (98° Fahrenheit,) more or less. Into this bath we dip the desired sheet of hard metal for the space of five to twenty minutes, more or less, when the sheet will be found sufficiently covered with pure tin. It may then be polished or rubbed bright with soft cloth or leather.

It will be found that steel or iron coated with tin or alloy can be used for cooking-utensils, and for every article in which sheet tin is employed. The surface being entirely uniform, it cannot be affected by dampness, and thus serves to prevent rust.

Our process prevents oxidation or corrosion in zinc. We can produce very large sheets thereof, when, by the process now employed, it can only be produced in small pieces. For lining bath-tubs, water-cisterns, and the like, our zinc will be found invaluable.

For photographic and lithographic purposes, we interpose between the sheets of covered or plated zinc suitable pieces of tissue or other paper, muslin, or any equivalent fabric, and then subject them to another

pressure; or we pass the metal between rollers having a slightly-roughened surface, so that the impression of the paper, fabric, or rollers will be imparted to the metal, and cause its surface to assume a certain roughness necessary for photographic, lithographic, printing, or any other ornamental purposes.

The uses to which our invention can be applied are numerous; generally speaking, to all purposes requiring stiff metal, which shall neither corrode, crack, nor be affected by heat or cold, and also to possess the advantages of pure tin.

We are aware that hard metals have been coated or plated with tin or alloys by an old and well-known process; this we do not, therefore, claim.

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

The within mode of coating or plating hard metals, substantially as described.

To the above, we have signed our names, this 11th day of January, 1867.

JOHN D. GRÜNEBERG,
SAMUEL H. GILBERT.

Witnesses:

JOHN A. WIEDERSHEIM,
WM. A. WIEDERSHEIM.