

# UNITED STATES PATENT OFFICE.

JOS. POLEUX, OF NEW YORK, N. Y.

## IMPROVEMENT IN THE PROCESS OF COATING METAL WITH METALS.

Specification forming part of Letters Patent No. **15,953**, dated October 21, 1856.

### *To all whom it may concern:*

Be it known that I, JOSEPH POLEUX, of the city and State of New York, have discovered or invented an improvement in the process of coating iron bolts, bars, sheets, spikes, nails, and other articles of iron with metallic alloys; and I hereby declare the following is a full and exact description thereof.

The nature of my invention consists in preparing iron to be coated by other metals, using therefor concentrated mineral acid, as stated below.

I prepare the iron articles to be coated by cleansing them in acid much in the usual way; but I do not dilute the acid, as the ordinary practice is. On the contrary, I use it as received from the manufacturer, because by so doing the operation of cleansing the iron is much shortened, and because I have discovered a mode of arresting its action on every part of an article submitted to it the instant its action is no longer necessary, and I therefore consume the least possible quantity. I prefer muriatic to nitric or sulphuric acid.

As soon as the articles to be cleansed are immersed in the acid, I drop one, two, or more small pieces of spelter among them, or pass them into the acid with the articles. A pound of spelter would be sufficient for half a ton or more of spikes or bolts. The acid acts at once and rapidly on the spelter, holds in solution what it dissolves, and precipitates a film of it on the minutest portions of the iron surfaces the instant the acid has cleansed them, and this film protects such portions from any further action of the acid while remaining in it. Without the spelter undiluted acid could not be used without great waste and injury to small or thin articles placed in it. Articles, when not unusually rusty or scaly, are cleansed in a minute, or even less, while a longer or shorter time is required, according to the condition of the surfaces and the strength of the acid. The articles are next taken out, and, without being washed, dried, or undergoing any other treatment whatever, are passed immediately, though slowly, into the bath of melted alloy that forms the coating, the only precaution required being to immerse them gradually, that the metal may not splutter or fly about, which it would do if their wet or moistened surfaces were plunged suddenly into it. I find the union of the coating with the surfaces is not only more readily formed, but it is more perfect when the articles are thus passed immediately from the

acid into the bath than when they are dried and exposed to the action of the air. The union, moreover, is effected, keeping the surface clean and free from oxidation by covering it with melted tallow, and occasionally using powdered sal-ammoniac.

The alloys forming the coating I constitute differently, according to the use to which the coated articles are to be put, some being coated with tin and very limited proportions of its ordinary alloys, in which there is no novelty; but there are purposes where a larger proportion of lead than has ever been used affords a better protection than tin alone—as sheathing for ships and covering of roofs—and as lead, from its comparatively low price, materially reduces the cost of the coating, it becomes desirable to introduce it in as large proportion as possible for the protection of iron. The following is the alloy which I now use: of one hundred parts, fifteen are of tin; seventy-five of lead; five of copper; five of regulus of antimony. This proportion of lead is so much larger than has ever been used or can be by current processes for coating iron that practical men have refused to credit the statement till they saw it verified, and witnessed even eighty per cent. successfully employed. I find the union of the tin and lead more complete with the antimony, and without the antimony the copper appears to be but mechanically mixed with the lead. This alloy leaves a coating on iron almost as white as tin alone, the copper and antimony neutralizing the blue color of the lead. The low temperature at which this alloy is used affects not the malleability or tenacity of iron coated with it.

What I claim as my improvement, and desire to secure by Letters Patent, in the process of coating iron-ware with metallic alloys, is—

The employment of muriatic, nitric, or sulphuric acid of the ordinary degrees of concentration in commerce—viz., muriatic of 18° of Baumé, nitric 38° of same, and sulphuric 66° of same—without diluting them, embracing the solution of spelter in the cleansing-acid, in the proportion and manner and for the purposes specified, and the passing the cleansed articles directly into the metallic bath without any intermediate treatment whatever.

Witnesses: JOSEPH POLEUX.

LOUIS SALIN,  
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