UNITED STATES PATENT OFFICE.

CALEB MARSHALL, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN COATING IRON AND OTHER METALS WITH PROTECTING ALLOYS.

Specification forming part of Letters Patent No. **144,403**, dated November 11, 1873; application filed October 21, 1873.

To all whom it may concern:

Be it known that I, CALEB MARSHALL, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Coating Iron and other Sheet Metal; 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

The object of this invention is to form upon sheet-iron, or upon articles made of iron or other corrodible metal, a coating of alloy or composition metal, which shall protect the surface from oxidation without materially injuring the body of the metal. By this treatment I am able to prepare sheet-iron at moderate cost, so as to be applied in forming roofs, cornices, moldings, brackets, ornamental iron-work, sheet-metal vessels, fences, and many similar articles to which iron has been applied, but for which it is not well adapted because of its liability to rust or corrode. The invention consists in the composition metal or alloy used for coating sheet-iron or other corrodible metal, and in the new manufacture of coated sheet-iron or other article of metal produced by the application of the alloys to the surface of iron or other corrodible metal by any of the known methods of coating, plating, or galvanizing.

The following description will enable those skilled in the art to make and use this invention.

The surface of the sheet-iron, or article to be coated, is first cleaned by any suitable process. That described in my patent dated May 16, 1871, No. 114,956, will answer the purpose; but any other equivalent process of cleaning the surface may be used, the object being only to prepare a clean surface, so as to cause the alloy coating to firmly adhere.

When thus prepared, the sheet or article is coated by any of the methods usually employed for tinning sheet-iron, or for galvanizing or zincing iron with an alloy of lead, tin, copper, zinc, and antimony. The following I find to be suitable proportions of these metals, viz:

Lead	85	parts.
Tin	5	"
Copper	5	"
Zinc	3	"
Antimony	2	"
	100	"

But I do not limit myself to these proportions, since the object of the invention is to produce the effect and new result which is accomplished by the use of these proportions rather than the mere bringing together of these metals in these proportions. Tin and lead form the base and essential part of the coating, and copper serves to render the coating more ductile, malleable, and tough, and in some degree harder. Antimony is, however, the element which especially gives hardness to the coating, and makes it susceptible of a high polish. The zinc also renders the alloy harder, and has the effect of preventing corrosion of the iron, as is well known to those acquainted with the properties of ordinary galvanized iron.

When a hard polished surface is not required, both the zinc and the antimony may be omitted, and replaced by lead.

I have described this invention as applied to sheet-iron, and articles formed of sheet-iron, by stamping, pressing, molding, and the like. It is also applicable to the coating of spikes, bolts, rods, bars, and other articles.

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

1. The improved alloys herein described for coating sheet-iron and other articles, composed of lead, tin, and copper, substantially in the proportions named, either alone or with the addition of zinc, or of zinc and antimony, as set forth.

2. As a new article of manufacture, sheet-iron, or other article of metal, as specified, coated with an alloy of lead, tin, and copper, with or without the addition of zinc, or zinc and antimony, substantially as specified.

In testimony that I claim the foregoing I have hereunto set my hand this 14th day of October, 1873.

CALEB MARSHALL.

Witnesses:
ALFRED MARSHALL,
HENRY F. MARLIN.