

UNITED STATES PATENT OFFICE.

CHARLES E. MANBY, OF McKEESPORT, ASSIGNOR TO EDMUND C. CONVERSE, OF PITTSBURG, PENNSYLVANIA.

ALLOY FOR COATING METALS.

SPECIFICATION forming part of Letters Patent No. 300,324, dated June 10, 1884.

Application filed October 19, 1883. (Specimens.)

To all whom it may concern:

Be it known that I, CHARLES E. MANBY, of McKeesport, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Alloys for Coating Metals, (Case D;) and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to alloys for coating metal sheets, wire, pipe, and other articles, its object being to overcome the objections found in the coating-alloy patented by John B. Jones November 16, 1880, No. 234,482. In the alloy as described in said patent the different metals are employed in about the following proportions: lead, fifty (50) to fifty-six (56) per cent. of the entire alloy; zinc, twenty-eight (28) to thirty-six (36) per cent.; tin, fourteen (14) to sixteen and one-half (16½) per cent., and nickel from eleven one-hundredths ($\frac{11}{100}$) to fourteen one-hundredths ($\frac{14}{100}$) of one per cent. of the other metals. In the practical coating with this alloy it is found that the metals of the alloy are very liable to part or separate during the coating operation if the bath becomes too cool or too hot, so that it is necessary to maintain a very even and accurate heat. The alloy is also very liable to oxidize at the heat of the coating-bath, and is necessarily covered or protected from contact with the atmosphere by suitable means. It is also found that the zinc is so greatly in excess that after saturating the other metals a large proportion of free zinc remains. As the zinc is lighter than the alloy, it rises to the surface of the coating-bath, and as it oxidizes rapidly at the heat of the coating-bath it forms an oxide or surface dross thereon, this apparently accounting for the oxidation of the alloy above referred to. The sheets, wire, pipe, or other articles to be coated are necessarily immersed into the coating-bath and withdrawn therefrom through this free zinc or surface dross, and the zinc partially coats them when entering, and the dross adheres to the coated surfaces of the articles and mars them when they are withdrawn. For these reasons, in coating these articles, care has necessarily been taken that as the coated articles were withdrawn they were kept from contact with this dross, and this added much to the trouble and expense of coating. The

excess of zinc also increases the cost of the coating-alloy, without in any way improving the quality of the coating formed, the excess being in some cases detrimental, as if the surface of the article is only covered with this free zinc, though a hard coating is obtained, it affords but little protection from oxidation, and is liable to break off.

I have discovered that by changing the proportions of the metals in the alloy all these objections can be overcome, and I form my improved alloy of these metals in the following proportions: lead, from sixty (60) to eighty (80) per cent. of the entire alloy; zinc, from ten (10) to fifteen (15) per cent.; tin, from fifteen (15) to twenty (20) per cent., and nickel from six one-hundredths ($\frac{6}{100}$) of one per cent. to one (1) per cent.

My improved alloy is compounded in substantially the same manner as the patented alloy above referred to. The proportion of nickel is placed in a suitable crucible or furnace and melted, and to this is added from fifteen to twenty-five times as much lead, and the two metals are highly heated and thoroughly mixed and alloyed, thus forming what is termed the "plant." The alloy as formed is cast for future use or poured directly into the melted lead or lead and zinc of the coating-alloy. The zinc employed is melted in a suitable pot or furnace, and the body of the lead is added. The plant above described is then introduced, and finally the melted tin is poured into the pot and thoroughly mixed with the other metals. The metals are preferably first melted and then intermingled; but the zinc may be first melted and the lead and tin added when cold, and mixed therewith when melting. The alloy thus formed is then cast into ingots or poured directly into the coating-pot, and when at the proper temperature employed for coating. The sheets or other articles to be coated are coated in the same manner as when coating with zinc or the above patented alloy.

It is proven in the practical use of my improved alloy that all the metals are perfectly united, so that they have no tendency to part or separate under different changes of temperature; also, that there is no surplus of any of the metals employed, so that there is no free zinc or dross floating on the surface of the coat-

ing-bath. It is found that the alloy has no tendency to oxidize at the temperatures at which the articles are coated, so that there is no loss whatever from this source, and the surface of the bath remains practically clean, there being no liability of the marring of the articles by this dross as they are withdrawn, and all necessity of protecting the metal from contact with the atmosphere is overcome. When the articles to be coated are immersed, they pass directly into the coating-alloy without passing through the free zinc and becoming partially coated therewith.

What I claim as my invention, and desire to secure by Letters Patent, is—

The alloy composed of the following ingredients, in the following proportions: lead, from sixty to eighty per cent.; zinc, from ten to fifteen per cent.; tin, from fifteen to twenty per cent., and nickel from six one-hundredths of one per cent. to one per cent., substantially as set forth.

In testimony whereof I, the said CHARLES E. MANBY, have hereunto set my hand.

CHARLES E. MANBY.

Witnesses:

JAMES I. KAY,
J. N. COOKE.