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. 306,338, dated October 7, 1884.

Application filed October 19, 1883. (No 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 a new and useful Improvement in Alloy for Coating Metals; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to alloys for coating metals, having special reference to certain improvements in the alloy of nickel, lead, tin, and zinc patented by John B. Jones, November 16, 1880, No. 234,482.

My invention consists in an alloy composed of lead, zinc, tin, nickel, and copper or copper alloys compounded for use as a coating for metal sheets and other metal articles, to prevent oxidation and otherwise to protect the surface thereof.

The proportions of my improved alloy preferred by me are 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.; nickel, from six one-hundredths ($\frac{6}{100}$) of one per cent. to one (1) per cent., and copper from six one-hundredths ($\frac{6}{100}$) of one per cent. to one (1) per cent. The proportions of the alloy may of course be varied beyond these limits; but I find the alloy formed more efficient for coating purposes when the above proportions are observed, and that, if the copper exceeds the proportion of one and one-half per cent. of the entire alloy, it is liable in presence of liquids to generate galvanic action with the zinc, and thus gradually destroy the zinc of the coating, and the metals thus freed from the coating would be deleterious to drinking-waters.

In preparing my improved alloy the nickel, copper, and a portion of the lead are first united or alloyed to form what is termed the "plant." To accomplish this I generally first melt from one to two pounds of nickel in a crucible or other suitable furnace, and then add from fifteen to twenty-five times as much lead, preferably in a molten state. The two metals are raised to a high heat, and a rod or bar of copper is then inserted through the mouth of the crucible and the metals thoroughly stirred and mixed therewith, as described in an application of even date herewith, No. 109,472. During this mixing, on account of the high heat of the plant, a portion of the copper rod melts and unites or alloys with the nickel and lead in the crucible, thus forming an alloy or plant composed of nickel, copper, and lead, the plant generally containing about the same proportions of nickel and copper.

Instead of introducing the copper in the manner above described, the proper proportion may be placed in the crucible cold or melted, and poured in, and the metals of the plant mixed in some other manner; but I prefer the use of the copper rod, as the other metals are mixed without the introduction of any metal foreign to the alloy, and it overcomes the necessity of stirring with an iron rod, as has heretofore been the practice, thus preventing the introduction of any drossing metal into the plant, as is fully set forth in an application of even date herewith. However, the copper may, if desired, be melted in the crucible, and all or a portion of the nickel be introduced by mixing the plant with a nickel rod. The copper may also be introduced in the form of an alloy with any of the metals of my improved alloy—as, for example, brass. The plant thus formed is then cast for future use or poured directly into the melted lead or lead and zinc of the coating-alloy.

The body of the zinc employed is melted in a suitable pot, and into this pot the lead is introduced, being preferably in a molten state. The plant is then introduced into the melted lead and zinc, and finally the melted tin is poured into the pot and thoroughly mixed with the other metals. The alloy thus formed can be either cast into ingots to be remelted for coating purposes or poured into the coating-tank for immediate use. The coating metal is employed in the same manner as the patented alloy above referred to.

It is found by the practical use of my improved alloy that the introduction of the copper into the plant lowers the temperature necessary to melt and alloy the other metals thereof; also, that instead of rendering useless a

portion of the metal, and thus decreasing its binding-power, as is the case where iron enters the plant, it acts in connection with the nickel and aids it in binding or holding together the other metals of the alloy, causing the metal to hold together under greater changes of temperature, and thus overcoming entirely the parting or separation of the metals on the cooling of the coating bath. It also increases the fluidity of the coating bath, and for this reason reduces the quantity of alloy required for coating.

I am aware that alloys having from eighty-nine to ninety-five per cent. of copper and different proportions of zinc, tin, lead, and nickel have been employed for bronzes; but these alloys would not be suitable for coating purposes.

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

The alloy for coating metals herein described, composed of lead, tin, zinc, nickel, and copper, the copper being in the proportion of six one-hundredths ($\frac{6}{100}$) of one per cent. to one and one-half ($1\frac{1}{2}$) per cent. of the entire alloy, 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. U. COOKE.