

UNITED STATES PATENT OFFICE.

FRANCIS J. CLAMER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JOSEPH G. HENDRICKSON, OF SAME PLACE.

PROCESS OF TREATING LEAD TO IMPART TO IT THE PROPERTY OF ADHERING TO OTHER METALS.

SPECIFICATION forming part of Letters Patent No. 283,077, dated August 14, 1883.

Application filed August 17, 1882. (Specimens.)

To all whom it may concern:

Be it known that I, FRANCIS J. CLAMER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in a Process of Treating Lead to Impart to it the Property of Adhering to other Metals, of which the following is a specification.

Heretofore great difficulty has been experienced in coating the surfaces of metals with lead, and by the ordinary method it is almost impossible to put a smooth surface of this metal upon iron, copper, brass, yellow-metal, &c.

The object of my invention is to treat melted metallic lead by adding thereto sal-ammoniac, arsenic, phosphate of lead, and borax, or a similar flux, and by this method so change the nature of the metal that by a process similar to galvanizing with zinc the surfaces of metals, such as iron, copper, brass, &c., may be covered with a complete, smooth, and permanent coating of lead, free from holes, and not liable to scale off.

Lead while in a molten state absorbs various gases from its surroundings and from the atmosphere. The gases thus absorbed prevent it from adhering closely to the surface of metals dipped in it, and cause the small holes and blisters frequently found in a sheet of metal coated with lead in the usual way. Melted lead is also thick and sluggish. Consequently a coating formed in the ordinary manner is full of ridges, the metal being very unevenly distributed over the surface of the sheet. I have discovered a process whereby these difficulties are overcome. I treat the lead while in a molten state with certain articles, which render it peculiarly adapted for use as a coating material. These articles are sal-ammoniac, arsenic, and phosphate of lead. The sal-ammoniac has great cleansing power, and drives out from the lead all the gases and impurities which it has absorbed from its surroundings. The arsenic, by its hardening and solidifying qualities, renders the lead incapable of receiving any further impurities or gases. In my experiments I have found that it makes the lead permanently impervious to

these influences, and the lead may be melted over and over again without losing the effect of the arsenic. The phosphate of lead destroys the sluggishness and renders the mass limpid and easily-flowing. I have found that the combined effect of these materials upon a mass of molten lead, when applied as hereinafter set forth, is to render it an excellent coating. The hardening influence of the arsenic is mollified by the softening and liquefying effect of the phosphate, while the tendency of phosphorus in its crude state to render the lead scaly is taken away by the cleansing effect of the sal-ammoniac.

To carry my invention into effect I take ordinary pig-lead and melt it in a vessel suitable for the purpose, after which the surface of the melted metal is covered with powdered charcoal. This is done to prevent oxidation and to retain the materials which I afterward introduce. When the lead has thus been melted and covered with charcoal, I add, for every one hundred pounds of lead, first three ounces of sal-ammoniac, then half an ounce of arsenic, and after this three ounces of the phosphate of lead, and, lastly, half an ounce of borax or a similar flux. These substances are introduced separately and immediately one after the other, the metal being gently agitated meanwhile, in order that they may be thoroughly distributed through the whole mass. When the metal has been thus treated, all that is necessary in order to coat an article is to free the surface thereof from any dirt or scale and then dip it in the same manner as when galvanizing with zinc. If the metal is not needed for immediate use, it may be run into bars or ingots and used at any future time, either as a solder or for coating the surfaces of articles.

The action of sal-ammoniac, arsenic, and phosphate of lead, as herein set out, is not confined to lead alone; but other metals—such as tin and zinc—that are used for metal-coating may be improved in a similar manner. I do not therefore confine my invention solely to the treatment of lead.

The proportions of sal-ammoniac, arsenic, phosphate of lead, and borax may be varied, and the use of the borax or flux omitted entirely; but I have found by experimenting that

the best results are obtained when the above proportions are preserved and borax or a similar flux used. I do not therefore confine myself to the exact proportions as herein set out.

5 I propose to make the use of the borax, in conjunction with the other materials, the subject of a separate application.

I have made the product of this process the subject of a separate application for patent.

10 What I claim as new, and desire to secure by United States Letters Patent, is—

The process of purifying lead, tin, zinc, and

similar metals and preparing them for metal-coating, which consists in providing a molten bath of the metal and subjecting it to the action of sal-ammoniac, arsenic, and phosphate of lead, substantially as herein set forth. 15

In testimony whereof I affix my signature in presence of two witnesses.

FRANCIS J. CLAMER.

Witnesses:

THOMAS D. MOWLDS,
FRED J. LAMBERT.