

UNITED STATES PATENT OFFICE.

WILLIAM S. HAWLEY, OF NEW YORK CITY, ASSIGNOR TO DAVID J. MILLARD & CO., OF CLAYVILLE, NEW YORK.

IMPROVEMENT IN METAL ROOFING.

Specification forming part of Letters Patent No. 125,456, dated April 9, 1872.

To all whom it may concern:

Be it known that I, WILLIAM S. HAWLEY, of the city of New York, in the county and State of New York, have invented a new and useful Improvement in Composition Metal for Roofing and other purposes; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same.

This invention relates to certain new and useful improvements in metal for roofing, linings, pipe, either cast or made from the sheet, and other purposes; and consists in combining certain well-known metals, and thereby forming a composition metal, which, when rolled into sheets suitable for roofing, linings, and all similar purposes, or cast or made into pipe, resists the action of salt-water and most of the acids, and does not perceptibly expand or contract from heat and cold.

In carrying out my invention, I use lead, tin, bismuth, and aluminum, or the lead, tin, and bismuth without the aluminum, and with or without the bismuth, according to the use for which the metal is intended.

In forming my composition metal I use the above-mentioned metals in various proportions, but never use so much as one-fifth part of tin to four parts of lead.

I am aware that lead, tin, and bismuth have before been combined for forming a composition sheet metal for roofing. I am conversant with an article of this kind composed of from one-fifth to one-half tin, but I distinctly disclaim such a composition.

In my attempts to manufacture and utilize such a composition, mechanical difficulties of an insuperable character have been met with; difficulties which caused the loss of thousands of dollars, and finally compelled the abandonment of the enterprise. I then commenced a series of experiments with the same metals, and discovered that, by using a much less quantity of tin to a given quantity of lead, I could produce an article subject to no mechanical difficulties in the process of manufacture, and in every way su-

perior to what had before been manufactured. I have found that a metal composed of lead, one hundred pounds, tin, sixteen pounds, and bismuth, one ounce, with from three to five pounds of aluminum added, is best adapted for roofing and the other purposes for which it is intended. As the purposes are various, the proportions named may accordingly be varied, and the aluminum may be entirely dispensed with where it is not desired to furnish a very fine quality of metal, and the bismuth may be dispensed with, or either aluminum or bismuth may be dispensed with.

The metals used may vary from five pounds to twenty pounds of tin to one hundred pounds of lead, and from one ounce to two pounds of bismuth to the said quantity of tin and lead, when bismuth is used.

In preparing the metal, I first fuse the lead in an iron vessel, and then add the block-tin, taking care that the lead is not at so high a temperature as to burn or vaporize the tin. When the tin has been fused and thoroughly mingled with the lead, I introduce about half a pound of tallow to the hundred pounds of metal, which cleanses the combined metals from all impurities, which may be skimmed from the surface. The bismuth is then introduced, and also the aluminum, when aluminum is used. When the composition has been thoroughly stirred it is ready to be poured into the molds, and thus formed into ingots or slabs. After being perfectly cooled the ingots or slabs are ready for the rolling-mill.

This composition metal can be cast and rolled without cracking, and no mechanical or other difficulties are met with in rolling it to extreme thinness, making a most tough and tenacious sheet, admirably adapted for roofing, lining barrels for holding petroleum, mineral water, and all similar fluids, sheathing vessels, watertight floors, damp walls, and various other purposes. No acids affect it which will not destroy gold and silver.

The advantages and value to the public of this metal are many, and must be obvious to all.

I am aware that a patent was granted to L. L. Enos May 12, 1868, for a compound formed of tin, lead, and antimony; but this has been found to crack in cooling, which renders it, practically, of very little value. Hence I desire to combine such materials as will overcome this difficulty.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

A metallic roofing-compound formed of lead and tin combined with bismuth and aluminum, in the proportions specified.

WILLIAM S. HAWLEY.

Witnesses:

GEO. W. MABEE,
T. B. MOSHER.