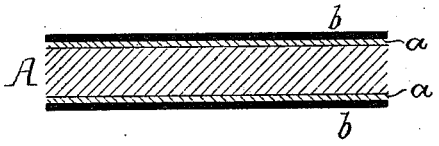
W. H. WAHL & E. Y. ELTONHEAD.

Process for Galvanizing and Tinning Iron.

No. 213,015 Patented Mar. 4, 1879.



Witnesses
Henry Howson Jr
Harry Smith

Inventors,
William H. Wahl
and
Edward Y. Eltonhead
by their Attorneys
Howson & Sons

UNITED STATES PATENT OFFICE.

WILLIAM H. WAHL AND EDWARD Y. ELTONHEAD, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS OF ONE-THIRD THEIR RIGHT TO CALEB H. HORNE, OF SAME PLACE.

IMPROVEMENT IN PROCESSES FOR GALVANIZING AND TINNING IRON.

Specification forming part of Letters Patent No. **213,015**, dated March 4, 1879; application filed November 18, 1878.

To all whom it may concern:

Be it known that we, WILLIAM H. WAHL and EDWARD Y. ELTONHEAD, both of Philadelphia, Pennsylvania, have invented a new and useful Improvement in the Process of Galvanizing or Tinning Iron, of which the following is a specification:

The object of our invention is to deposit on iron objects a permanent and uniform coating of zinc or tin at much less expense as regards the consumption of time and material than by the process usually practiced, and to improve the quality of the product, and these objects we attain in the following manner:

In coating iron with zinc or tin, the usual process is to first subject the objects of cast or wrought iron or steel to the process of pickling—that is, immersing in a bath of dilute sulphuric acid, then in water, then in a bath of muriatic acid, and, after drying the objects, to immerse them in the bath of molten zinc or tin. The objections to this process are, first, injury to the iron, and especially if it be in the form of thin plates, by the corrosive action of the acid treatment; second, the formation of what is known as "dross" in the zinc or tin bath, this dross representing a loss of about thirty-three and one-third per cent. of the zinc or tin. This dross is due to the formation of a zinc-iron or tin-iron alloy in the bath by the intimate contact of the iron with the zinc or tin, and the formation of this alloy is promoted by the spongy condition to which the surface of the iron has been reduced by the acid treatment—a condition which has the twofold disadvantage of promoting the zinc-iron or tin-iron alloy and of rendering the adhesion of a proper coating of zinc or tin tedious, and, in many cases, imperfect.

In carrying out our invention we entirely discard the acid treatment above referred to, and adopt any process of mechanical cleansing, which may be effected in different ways. Many castings, or even wrought-iron articles, may, for instance, be cleansed by the tumbling process—that is, by placing them in a hollow vessel with sand or pebbles and rotating the vessel. Other articles may be scoured with sand and stiff brushes; others, again, by simple grinding.

By this operation the surface of the metal is reduced to the best condition for the next branch of the process, which is that of coating it with a very thin film of copper. This, we find, may be best accomplished by dipping the cleansed articles of iron in a solution of chloride of copper, although other salts of copper may be used. Very little time is required for this duty, as the copper is instantly deposited by simple dipping and immediate withdrawal of the articles from the salt solution.

It may be remarked here that the coating of copper adheres to the iron thus mechanically cleansed much more tenaciously and uniformly than to iron the surface of which has been rendered spongy by the acid treatment, in which case a longer time is required for the coating of copper, and the latter does not adhere with the desired tenacity.

After the copper-coated iron objects have been properly dried, they are at once immersed in the bath of zinc or tin. As the coating of copper prevents the surface of the iron from being brought in contact with the metal in the bath, the formation of the zinc-iron or tin-iron alloy, which is the main cause of the dross, and the consequent loss of a large percentage of the metal, in the old process, is obviated, and the zinc or tin has such an affinity for the copper that it is deposited much more rapidly and uniformly on the same than on the pickled and spongy surface of the iron, the time consumed in obtaining a proper coating of zinc, for instance, being one-tenth of that required in practicing the usual process, and the coating being much more uniform and free from spots and other defects than that imparted in the usual manner.

It will be seen that the process is a simple one, demanding less labor in carrying it into effect than the old process; that a permanent and uniform coating is obtained, partly by the preliminary mechanical cleansing, which insures the intimate adhesion of a thin film of copper to the surface of the iron, and partly by the superior affinity of the zinc or tin for

the same, and, finally, that there is economy in the consumption of zinc or tin, due partly to the non-formation of dross by the protection of the iron-surface from direct contact with the molten tin or zinc, and partly to the decided lessening of the time of immersion, due to the superior affinity of the copper coating for the zinc or tin.

It should be understood that although we have referred to the coating of iron objects with zinc or tin, they may be coated by immersion in baths of alloys of which zinc or tin, or both, form a part.

We do not desire to claim the within-described branches of the process separately considered; but

We claim as our invention—

The mode herein described of coating iron objects with zinc or tin, or with an alloy containing zinc or tin, or both—that is to say, first, mechanically cleansing the surface of the iron; second, depositing thereon a thin coating of copper; and, third, subjecting the copper-coated iron object to a bath of molten tin, zinc, or alloy, all as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM H. WAHL.
EDWARD Y. ELTONHEAD.

Witnesses:
ALEX. PATTERSON,
HARRY SMITH.