UNITED STATES PATENT OFFICE.

NAPOLEON W. WILLIAMES, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND WM. W. KEYS, OF SAME PLACE.

IMPROVEMENT IN MANUFACTURE OF ALLOYS, &c.

Specification forming part of Letters Patent No. **212,077**, dated February 4, 1879; application filed September 2, 1878.

To all whom it may concern:

Be it known that I, NAPOLEON W. WILLIAMES, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in the Manufacture of Alloys and Metal Castings; and I do hereby declare that the following is a full, clear, and exact description of the same.

The invention relates to an improvement in the manufacture of alloys, which improvement is applicable also to the melting and casting of metals.

The improvement consists in applying to the surface of the melted copper, or other metal, scraps of horn, which have a peculiar action in improving the character of the alloy or casting.

In carrying out my invention I take preferably the clippings or parings of horn that come from the turners' shops, and apply to the surface of the melted metal in the crucible a sufficient quantity to cover it to the depth of an inch or so, which charge of horn is renewed at intervals, as occasion may require. In casting bronzes, brasses, or gun-metal, the horn is applied to the copper as soon as it is melted, the tin or zinc being added afterward. The effect of this substance in this connection is peculiar in producing a product which is hard, dense, homogeneous, and sonorous in a remarkable degree, and especially adapted by reason of such qualities to use for journal-bearings, bell-metal, gun-metal, and engine-work.

With respect to the rationale or theory of the effect produced, this I am not able to fully explain, but believe that one important advantage attained thereby, is in deoxidizing the metals, the horn serving to effect this partly by the heavy hydrocarbon gases which it gives off, and partly by the crust or film of carbon which remains upon the surface of the metal from the melting of the horn. For this reason I have applied to the product the name of "deoxidized bronze."

I am aware of the fact that charcoal and various other reducing agents have been employed upon the surface of the melted metals in the melting-pot to keep down oxidation; but none of said known reducing agents has the effect produced by the horn.

Bronze manufactured by this process can be bent cold without sign of fracture, may be hammered at its end to one-half its thickness without splitting, and by reason of its fineness of texture is capable of receiving a polish so fine as to resemble gold. In pouring into the mold, the liquid runs without gas or smoke, and in a smooth heavy stream, like oil, and the metal when cold is of a very fine and homogeneous texture free, from "blow-holes," and combining a remarkable hardness and malleability, the lathe-turnings running off in long thin spiral ribbons instead of chipping off into little bits, as is usual.

In defining the scope of my invention, I do not limit myself strictly to the use of horn, as the hoofs of animals, clippings of rawhide, and other analogous material can be used.

Having thus described my invention, what I claim as new is—

The process herein described of hardening, toughening, and increasing the homogeneous character of metal castings and alloys, which consists in applying to the surface of the molten metal, pieces of horn or other analogous material, substantially as and for the purpose described.

The above specification of my invention signed by me this 29th day of August, A. D. 1878.

N. W. WILLIAMES.

Witnesses:

SOLON C. KEMON,

EDWD. W. BYRN.