UNITED STATES PATENT OFFICE.

ARCHIBALD SMITH, OF TARENTUM, PENNSYLVANIA, ASSIGNOR TO THE ALLEGHENY STEEL COMPANY, A CORPORATION OF PENNSYLVANIA.

METHOD OF PRODUCING PRACTICALLY PURE IRON.

1,008,377. Specification of Letters Patent. Patented Nov. 14, 1911.

No Drawing. Application filed October 6, 1910. Serial No. 585,725.

To all whom it may concern:

Be it known that I, ARCHIBALD SMITH, citizen of the United States, residing at Tarentum, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Methods of Producing Practically Pure Iron, of which the following is a specification.

This invention relates to a certain new and useful method of producing practically pure iron.

The invention has for its object an improved process for producing iron practically free of carbon, manganese, silicon, phosphorus, sulfur and oxygen.

In carrying out my improved process I charge a furnace, preferably a basic open hearth furnace with pig iron, cast iron, or iron in any other usual form or combination employed in charging an open hearth furnace and in the ordinary way, and the carbon, manganese, phosphorus, sulfur, silicon and oxygen are removed from the bath to the greatest possible extent by the application of heat, fluxes and reagents, according to the well known basic open hearth process. During this treatment sticks of wood are forced below the surface of the metal bath, whereupon a violent agitation and ebullition of the bath is produced. This agitation and ebullition have the effect of bringing all portions of the metal into intimate contact with the supernatant slag, thereby eliminating substantially all of the impurities.

In practice I prefer to use sticks of spruce, or other coniferous woods, but I do not desire to limit myself in this particular, and the sticks may be introduced into the bath in any suitable or preferred manner, such for instance, as through the peep holes of the furnace doors. As the sticks are consumed they are replaced by others and the process continued until the pronounced agitation of the metal bath ceases. By this introduction of wood into the bath the metal bath is substantially deoxidized without increasing the carbon content.

The product resulting from my improved process will, because of its high degree of purity, solidify without blow holes or spongy top, and with little or no piping. It is less susceptible to corrosion than any other known iron; it is highly malleable and ductile; may be worked at a low heat; and by reason of the fineness of its surface it is particularly receptive of metal coatings of all kinds.

I desire to call attention to the fact that by the expression practically pure iron as used in the specification and claims I wish to be understood as referring to an iron that is practically free from the impurities which are usually contained in the iron of commerce.

I claim:

1. The process of producing practically pure iron, which consists in substantially eliminating from crude iron the contained silicon, manganese, carbon, phosphorus and sulfur, and introducing wood into the molten bath of iron, thereby agitating and deoxidizing the metal.

2. The process of producing practically pure iron, which consists in treating crude iron in a basic open-hearth furnace and substantially eliminating the contained silicon, manganese, carbon, phosphorus and sulfur, and introducing wood into the molten bath of iron, thereby agitating the metal, thoroughly bringing it into contact with the supernatant slag, and effecting its deoxidation.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ARCHIBALD SMITH.

Witnesses:
HARRY E. SHELDON,
A. H. MCNAMEE.