

UNITED STATES PATENT OFFICE.

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IRON MANUFACTURE.

986,359.

Specification of Letters Patent.

Patented Mar. 7, 1911.

No Drawing. Application filed July 30, 1908, Serial No. 446,124. Renewed September 10, 1910. Serial No. 581,448.

To all whom it may concern:

Be it known that I, ROBERT B. CARNAHAN, Jr., a citizen of the United States, residing at Middletown, Butler county, Ohio, have invented certain new and useful Improvements in Iron Manufacture, of which the following is a specification.

The present invention, comprehending the production of a markedly superior grade of iron from comparatively low priced material and by a method characterized by special economy and regular certainty of result, will be readily understood from the following description.

There is to be employed a high-powered furnace capable of what might be termed a particularly "fierce" action. Having in view the completion of the ultimate product and the other material charged into the furnace, the furnace is to be charged with lime to bring the sulfur and phosphorus down to the limit hereinafter stated for the product, and it is to be charged with iron ore to bring down the carbon and manganese to the limit hereinafter stated for the product.

The furnace is to be charged with pig iron of the following characteristics:—Must be machine cast, sand cast pig being unsuitable. Phosphorus to be not over 1%, and as low as possible. Sulfur to be not over .05%, and as low as possible. Silicon to be not over 2% and as low as possible. Up to 50% of ordinary wrought iron or steel scrap, wrought iron much preferred, may be added, but not malleable or other cast iron scrap. All is to be melted and brought to a temperature of not less than 2850 deg. Fah. Tap into ladle with a degasifying agent; aluminum preferred. Cast in ingot mold. Everything from tapping to casting is to be done with utmost rapidity. After the charge has been brought to its high heat, no temperatures less than 2775 deg. Fah. must exist in the metal before it reaches the ingot mold. The resulting ingot is practically free from piping. The ingot thus produced represents the best of iron products made from comparatively cheap material and by an economical and practically regular and certain method.

The material of the ingot has the following characteristics:—Structure is crystalline. Density greater than purest charcoal iron. Ductility extremely high. Tensile strength equal to extra good charcoal iron. Forges and rolls with facility at usual temperatures for iron. Resists all corroding agents to an extraordinary degree. Substantially proof against internal or external electrolysis. Perceptibly hardened upon quenching, not more than ordinary good iron and much less than the mildest steel. Unlike all other iron it galvanizes with the perfection and facility of steel. Will not weld satisfactorily without a flux. The composition in addition to the pure iron will be:—manganese below .2%, sulfur below .035%, phosphorus below .075%, carbon below .15%.

In the above analysis maximum values are given and the perfection of the product and the practical regularity and certainty of the method may be judged from the fact that in every day practice by this method I am regularly producing a product analyzed as follows:—silicon, trace; manganese, .030; sulfur, .020; phosphorus, .005; carbon, .030; iron, 99.915.

I claim:—

The improved method of iron manufacture consisting: first, in taking machine cast pig iron whose phosphorus is not over 1% and whose sulfur is not over .05% and whose silicon is not over 2%, along with lime to reduce sulfur and phosphorus, and iron ore to reduce carbon and manganese: second, melting the charge and bringing it to a temperature of not less than 2850 deg. Fah.: third, tapping the melted hot charge into a ladle with a degasifying agent: fourth, pouring the ladle charge into an ingot mold, the temperature between tapping and pouring to be at no time below 2775 deg. Fah., substantially as set forth.

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Witnesses:

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