

UNITED STATES PATENT OFFICE.

NATHAN WASHBURN, OF BOSTON, MASSACHUSETTS.

METHOD OF MAKING STEEL CASTINGS.

SPECIFICATION forming part of Letters Patent No. 513,163, dated January 23, 1894.

Application filed January 28, 1893. Serial No. 460,032. (No specimens.)

To all whom it may concern:

Be it known that I, NATHAN WASHBURN, residing in Boston, county of Suffolk and State of Massachusetts, have invented an Improvement in Methods of Making Steel Castings, of which the following description is a specification.

This invention relates to a novel method of making castings having the properties of steel. By experiment, I have ascertained that white cast-iron, may be converted into a metal having the properties of steel, by subjecting the said metal to the direct action of a decarbonizing flame, produced by the combustion of a hydrocarbon, preferably crude petroleum oil.

In accordance with my invention, the white cast-iron is subjected to the decarbonizing effect of the flame, produced by the combustion of petroleum oil, a sufficient length of time to convert the same in whole or in part, into a metal having the properties of steel, and in practice, I have found that this result may be effected in from four to six hours, the time also depending on the heat of the converting chamber or furnace in which the casting is placed. The physical appearance of the white cast-iron is completely changed by the conversion, and that which before treatment is very brittle and possesses little strength, is converted into a tough, tenacious and fibrous structure of great strength capable of being finished with a tool or otherwise and capable of being turned and drilled as readily as any hammered or rolled steel now commonly made. Another peculiar feature of the metal having the properties of steel, thus produced, is that the said metal is capable of taking a high polish, which is unaffected by atmospheric changes, and remains clean, smooth and of high polish even when exposed to moisture for a substantially long time.

In order that my invention may be readily comprehended, I will specifically enumerate the result of a chemical analysis for the amount of carbon in one casting, which was a section of a car wheel having a gray iron center or body and a white cast-iron rim or tread, produced by chilling the said rim after the ordinary manner of casting car wheels. The gray iron body or center contained 3.63 per cent. of carbon. The white cast iron

chilled rim or tread before treatment with the hydrocarbon flame was of a laminated structure with the laminations extending toward the center of the wheel; was very hard and brittle and not capable of being turned or drilled, and contained 2.09 per cent. of carbon, while another piece of the same chilled rim or tread, after treatment with the hydrocarbon flame as above described, had its laminated structure entirely changed into a tough, tenacious, fibrous structure of great strength, capable of being turned and drilled, and contained 1.97 per cent. of carbon. The precise reason why the hydrocarbon flame acts in this peculiar manner upon white cast iron is unknown to me.

By the term casting, I desire to include any shape, form or size of structure or article. The casting may be composed entirely of white cast-iron or it may be composed in part of white cast iron and gray iron and in this latter case, the white cast-iron portion may be converted into steel.

The gist of this invention resides in the fact, that white cast-iron, no matter how produced, may be converted into a metal having the properties and characteristics of steel, as above described.

I claim—

1. An improved method of making a metal having the properties of steel, which consists in subjecting white cast-iron to the direct action of a decarbonizing flame, produced by the combustion of a hydrocarbon, substantially as described.

2. An improved method of making a metal having the properties of steel, which consists in subjecting white cast-iron to the direct action of the products of combustion of crude petroleum oil, substantially as described.

3. An improved method of making castings having the properties of steel, which consists in subjecting the white cast-iron portion of a cast-iron casting to the direct action of the products of combustion of a hydrocarbon, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

NATHAN WASHBURN.

Witnesses:

JAS. H. CHURCHILL,
J. MURPHY.