Patented Mar. 19, 1929. 1,705,972

UNITED STATES PATENT OFFICE.

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PRODUCTION OF GRAY CAST IRON.

No Drawing. Application filed May 27, 1926, Serial No. 112,125, and in Germany November 25, 1925.

My invention refers to the production of gray cast iron and one of its objects is to provide means whereby a gray cast iron can be obtained in a simple manner, in which the greater part or all of the graphite has the form of fine scales or of laminæ or of a mixture of both.

As is well known to those skilled in the art the graphite appears in gray cast iron under two modifications, viz in the form of laminæ and in a fine scaly form. I have now ascertained that laminated graphite appears whenever there are still graphite nuclei present in the molten gray cast iron. The term "graphite nuclei" is intended to comprise small undissolved residual particles of graphite resulting from the crude iron used in the production of the gray cast iron, as well as small concentrations of carbon in the melt occurring in consequence of a not quite uniform distribution of the dissolved carbon.

I have further ascertained that these graphite nuclei can be made to disappear if the molten gray cast iron is either heated for a short time to a temperature considerably exceeding the upper temperature limit (about 1200° C.) hitherto used in the production of gray iron, or is kept fluid a longer time at a lower temperature which, however, still exceeds this limit. By applying a higher temperature (for instance keeping the melt fifteen minutes at 1400–1500° C.) as well as by keeping the melt fluid during a longer time (for instance two hours at 1250–1300° C.) a uniform dissolution of the graphite nuclei is obtained.

If a melt containing graphite nuclei is allowed to solidify, the gray cast iron obtained contains a quantity of laminated graphite corresponding to the quantity of nuclei. On the contrary, if a melt free from nuclei is allowed to solidify, only fine scaly graphite is obtained.

This discovery allows selectively producing on a large scale either gray cast iron with laminated graphite or gray cast iron containing fine scaly graphite, or a product containing both these forms. To this end it is merely necessary to produce test castings, for instance in the form of small test bars, the fracture or metallographic grinding of which allows ascertaining in a simple manner how far the destruction of the nuclei has proceeded.

The production of gray cast iron in which the greater part of the graphite is present under the form of fine scales offers certain technical advantages inasmuch as the mechanical properties of the casting are superior and gray cast iron having this property is particularly adapted for the production of castings having a bright guideway.

I wish it to be understood that I do not desire to be limited to the exact conditions of working above described except as defined in the claims.

I claim:—

1. The method of producing gray cast iron comprising the step of destroying the graphite nuclei in the metal by heating same to 1250–1300° C. and maintaining the said temperature through a time interval of a few hours before casting it until a substantially uniform distribution of finely divided non-lamellar graphite occurs throughout the metal.

2. The method of producing gray iron having a homogeneous distribution of finely divided non-lamellar graphite comprising the steps of heating the molten metal to a temperature ranging from approximately 1250° C. to approximately 1350° C. and maintaining the said temperature sufficiently long to destroy the graphite nuclei.

3. The method of producing gray iron having a homogeneous distribution of finely divided non-lamellar graphite which comprises heating the molten metal to approximately 1250° C. and maintaining substantially this temperature for a period of approximately two hours to destroy the graphite nuclei.

In testimony whereof I affix my signature.

HEINRICH HANEMANN.