Aug. 27, 1929. F. GREINER 1,726,433

PROCESS FOR THE MANUFACTURE OF STRONG MACHINABLE CAST IRON

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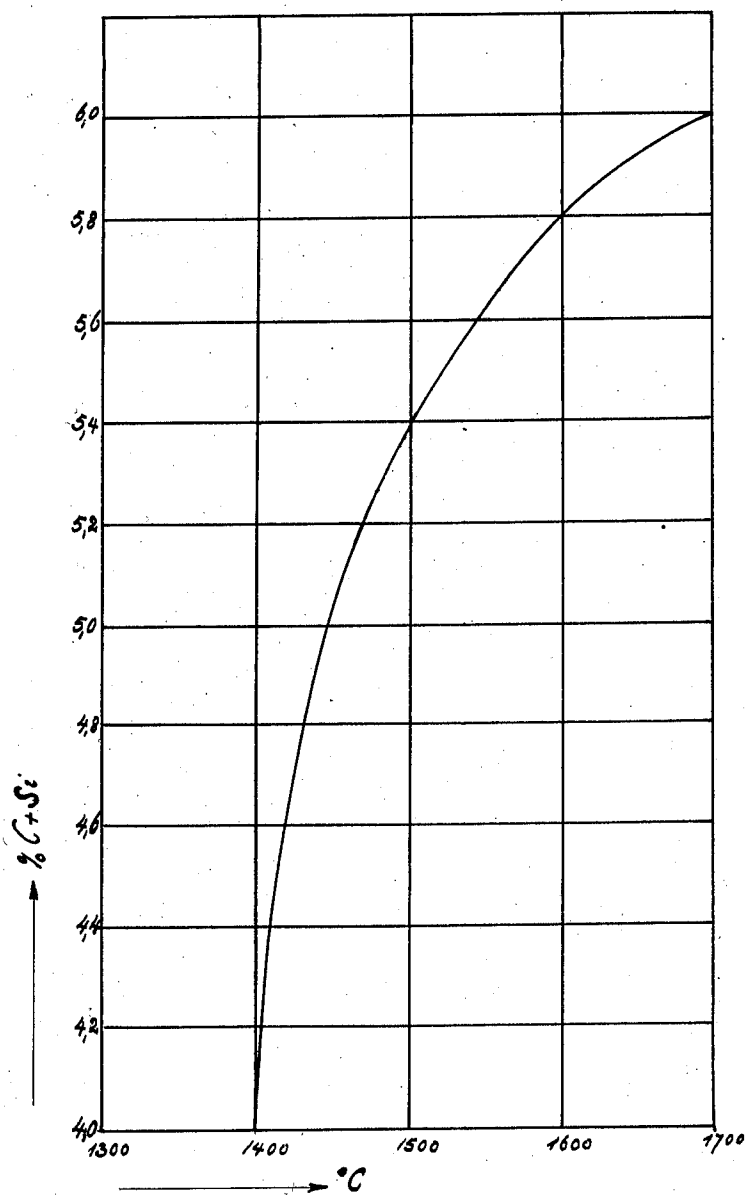

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UNITED STATES PATENT OFFICE.

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PROCESS FOR THE MANUFACTURE OF STRONG MACHINABLE CAST IRON.

Application filed November 2, 1926, Serial No. 145,837, and in Germany November 2, 1925.

This invention relates to casting processes and more particularly to processes for obtaining strong sorts of easily mechinable cast iron.

It is known that by the smelting of iron at high temperatures, that are above the ordinary temperatures obtainable in a cupola furnace, a fine distribution of the graphite in the metal is obtained which makes the castings very strong and easy to machine. This is extremely important where iron of a sort is used that becomes white on hardening after being melted in the ordinary way, as is particularly the case when the content of C+Si is low and the castings have thin walls or parts.

I have found that in employing such temperatures there are well defined relations between the structure of definite sorts of iron and their melting temperature and that the relationship is such that to obtain the best possible, chiefly cutectic, distribution of graphite the melting temperature chosen must be higher as the total content of C+Si increases. Hence in accordance with my novel process the metal to be cast is heated in a suitable furnace such as an electric furnace, oil-fuel flame furnace or the like to a temperature above that of a cupola furnace, i. e. to at least 1400° C. and the super-temperature is adapted to the sort of iron or to the content of C+Si in accordance with the law or laws discovered by my experiments. In doing this the influence of the thickness of the walls or parts of the castings or of the speed of cooling on the texture must be taken into account by either selecting the sort of iron in accordance with the said thickness and employing a super-temperature that corresponds with the sort of iron to be produced, or by taking the attainable super-temperature as a basis and then choosing the best sort of iron obtainable for the thickness of the casting required.

In the drawing a super-heating curve is shown which serves as a guide for obtaining casting of an cutectic graphite structure and having walls or parts of a medium thickness of 20 mms. The various total contents of C+Si are plotted as ordinates and the super-heating temperatures as abscissæ. The curve shows clearly that higher super-heating temperatures are required as the content of C+Si increases.

As far as the structure of the iron or the distribution of graphite in the same is concerned it makes no difference whether the iron is cast at the super-temperature or raised to the super-temperature and thereafter cooled to the normal casting temperature before casting.

I claim:—

1. The process of treating molten cast iron having a content of carbon plus silicon greater than 4.0%, to cause the metal upon solidification to contain the major part of the carbon in fine, graphitic form, which comprises the step of regulating the carbon plus silicon content and heating the molten metal to a temperature determined by a curve having approximately the following coordinates:

%C + Si	Temperature.
4.0	1400° C.
5.4	1500° C.
5.8	1600° C.
6.0	1700° C.

2. A process in accordance with claim 1 characterized by the fact that the superheated iron is cast at normal casting temperature.

In testimony whereof I have affixed my signature.

FRITZ GREINER.