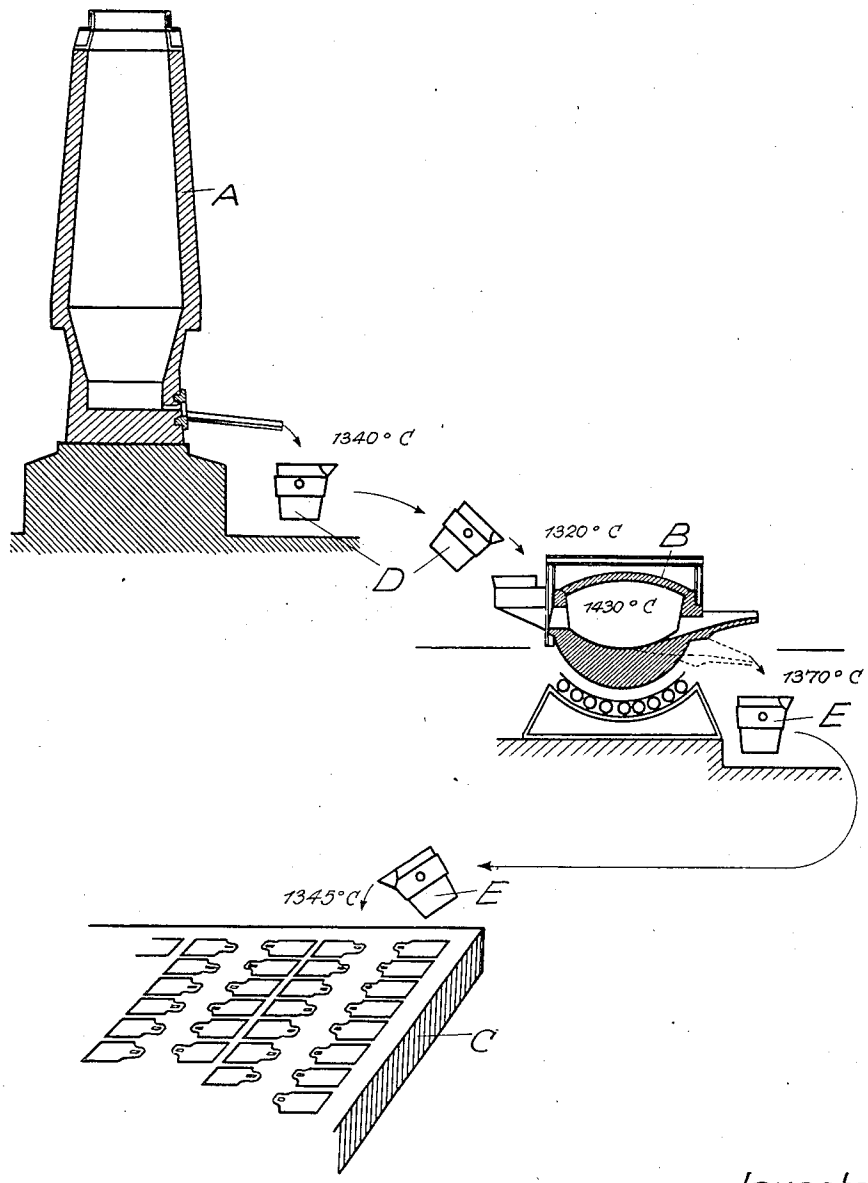
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PROCESS FOR THE PRODUCTION OF PIG-IRON HAVING A FINE GRAPHITIC TEXTURE

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PROCESS FOR THE PRODUCTION OF PIG-IRON HAVING A FINE GRAPHITIC TEXTURE

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5 Claims. (Cl. 75—27)

This invention relates to the production of pig-iron having a fine graphitic texture.

Various processes have recently been proposed for the production of high grade cast iron, which aim at improving the melt. These processes are attended however, with the drawback that they do not always yield a uniform end product with absolute certainty, even when great care is taken. Moreover, these processes are comparatively expensive, because they necessitate the use of apparatus which are difficult to operate.

The present invention aims at manufacturing high grade cast iron by producing pig-iron with a normal carbon content and of such nature which enables a melt for the production of high grade cast iron to be produced therefrom directly in a normally operated cupola furnace. The present invention consists in first subjecting the molten pig iron to a heat treatment after tapping, said treatment leaving the carbon content unaltered but producing pigs of a fine graphitic structure.

When employing the pig iron of the present invention instead of the ordinary pig iron, a cast iron is obtained directly with a fine graphitic structure, and with a corresponding improvement as regards the quality of the castings. In this connection, it is therefore not necessary to alter the mixing ratio of the charge, and special experience in the use of this iron is not necessary, so that it can be used by any foundry master instead of the pig iron hitherto used.

This iron with a fine graphitic structure is manufactured as follows:

The molten gray pig iron tapped from the blast furnace is subjected to additional heating in a special gas-heated furnace, is cast into pigs without any alteration in its state of aggregation being produced and is then brought on to the market. The product is particularly adapted for further treatment in cupola furnace for the purpose of producing refined cast-iron.

In the accompanying drawing is shown diagrammatically a suitable apparatus for carrying out the process.

The figure is a partial vertical section and perspective view of the apparatus.

Normal pig-iron which is produced by blast in the blast furnace "A" and which includes any material used for foundry purposes such as hematite iron, German foundry iron I and III, Luxembourg quality, etc. whose total quantity of carbon lies within the usual limits between 3.4% and 4%, passes, after the tapping, over the path through casting ladle "D" into the gas-heated tiltable pig-iron mixer "B".

The molten pig-iron is subjected in this furnace to a time-limited heat treatment constituting a reheating treatment whereby kish and other detrimental secondary constituents have an opportunity to be separated in the slag above the iron.

Since the gas furnace is tiltable, the slag may be tapped without difficulty shortly before it is poured out. After this re-heating and standing period, the same material, which has not undergone any physical change, passes out of the furnace "E" over the casting ladle "E" to the casting bed "C" where the iron is cast into pigs ready for the molds.

Numerous measurements of the temperature have been made during the production of hematite pig-iron and it was found that the temperature was 1340° C. when tapping the blast furnace and 1345° C. when casting the pigs.

The temperature drop from the tapping of the blast furnace to the pouring into the gas heated mixer was from 1340° C. to 1320° C., that is to say about 20° C. The temperature of the mixer varied during the period between pouring in and out and averaged about 1430° C.

The temperature was 1370° C. when pouring out of the mixer. The heat supply amounted accordingly to about 50° C. in the mixer. This temperature limit is sufficient for obtaining the desired refinement of graphite in this case.

The duration of this heat treatment has been found to be between one to four hours depending upon the temperature maintained in the heat treatment furnace.

The material which was solidified under normal time and temperature conditions in the pig molds of the casting bed "C" but is now fine-grained is suitable for dispatch or use.

The temperature of 1430° C. used in this case is only an example of a temperature which will be adapted to produce the desired fine graphitic structure in the pig iron and though it is a good and sufficient temperature for this purpose, the invention is not positively restricted to that precise temperature, but the term "about 1430° C." used in the annexed claims is intended only to illustrate the approximate height of temperature required.

What I claim and desire to secure by Letters Patent in the United States is:

1. A process for the production of castings having a fine graphitic structure, which comprises subjecting molten pig-iron to an additional heat treatment of such temperature about 1430° C. and duration of one to four hours so that a fine graphitic structure is obtained, casting this iron into

pigs and re-melting the so refined pigs in ordinary manner to obtain cast iron the duration of said additional heat treatment varying inversely as the temperature.

2. A process for the production of castings having a fine graphitic structure, which comprises subjecting molten pig-iron tapped from a blast furnace to an additional heat treatment of such temperature about 1430° C. and duration of one to four hours so that a fine graphitic structure is obtained, casting this iron into pigs and re-melting the so refined pigs.

3. A process for the production of castings having a fine graphitic structure, which comprises subjecting molten pig-iron in a gas-heated furnace to a heat treatment of such temperature about 1430° C. and duration of one to four hours so that a fine graphitic structure is obtained, casting this iron into pigs and re-melting the so refined pigs.

4. A process for the production of castings having a fine graphitic structure, which comprises subjecting molten pig-iron to an additional heat treatment at a temperature of at least 1430° C. during one to four hours until a fine graphitic structure is obtained, casting this iron into pigs and re-melting the so refined pigs.

5. A process for the production of castings having a fine graphitic structure, which comprises subjecting molten pig-iron to a heat treatment of such temperature about 1430° C. and duration of one to four hours so that a fine graphitic structure is obtained, casting this iron into pigs and re-melting the so refined pigs by the usual cupola furnace treatment.

ADOLF WIRTZ.