

COMMONWEALTH OF AUSTRALIA

Patent Act 1952

CONVENTION APPLICATION FOR A STANDARD PATENT

70424/87

594439

X/WE, GEORG FISCHER AKTIENGESELLSCHAFT, a joint stock company, of
CH-8201 Schaffhausen, Switzerland

hereby apply for the grant of a Standard Patent for an invention
entitled Process for the production of pearlitic cast iron

which is described in the accompanying complete specification.

This application is made under the provision of Part XVI of the
Patents Act 1952 and is based on an application for a patent or
similar protection made

in Switzerland

on 20 March 1986

No. (1131/86-1)

in

on

No. (

My/Our address for service is

: F.B. RICE & CO.,
28A Montague Street,
Balmain N.S.W. 2041

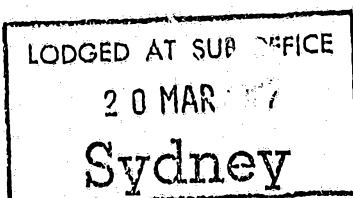
APPLICATION ACCEPTED AND AMENDMENTS

ALLOWED

8-1-90

Dated this 20th day of March

1987.



By:

Registered Patent Attorney

To: The Commissioner of Patents
COMMONWEALTH OF AUSTRALIA

Commonwealth of Australia
The Patents Act 1952
DECLARATION IN SUPPORT

In support of the (Convention) Application made by:

GEORG FISCHER AKTIENGESELLSCHAFT, of CH-8201 Schaffhausen,
Switzerland

for a patent for an invention entitled:

PROCESS FOR THE PRODUCTION OF PEARLITIC CAST IRON

XK(We) ppa.M. Szilagyi, Procurator & i.V.R.Link, Authorized
of and care of the applicant company do solemnly and sincerely declare as follows: Presentative

~~a) I am (We are) the applicant(s) for the patent~~

~~KK~~

b) I am (We are) authorised by the applicant(s) for the patent to make this declaration on its behalf.

Delete the following if not a Convention Application.

The basic application(s) as defined by section 141 (~~142~~) of the Act was (~~were~~) made

on 20 March 1986 in Switzerland

~~XXX~~

~~KK~~

~~XX~~

~~KK~~

by Georg Fischer Aktiengesellschaft

The basic application(s) referred to in this paragraph is (~~are~~) the first application(s) made in
a Convention country in respect of the invention the subject of the application.

~~a) I am (We are) the actual inventor(s) of the invention~~

~~KK~~

b) Ivo HENYCH, of im Buel 201, CH-8211 Stetten, Switzerland

is (~~are~~) the actual inventor(s) of the invention and the facts upon which
the applicant company

is (~~are~~) entitled to make the application are as follows:

the applicant is a person who would, if a patent were granted
upon an application made by the actual inventor be entitled
to have the patent assigned to it.

Declared at Schaffhausen this 16th day of March 1987

Signed

ppa. Szilagyi i.V.R.Link

Status

1) procurator

2) authorized presentative

Declarant's Name GEORG FISCHER AKTIENGESELLSCHAFT

F. B. RICE & CO PATENT ATTORNEYS

This form is suitable for any type of Patent Application. No legalisation required.

(12) PATENT ABRIDGMENT (11) Document No. AU-B-70424/87
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 594439

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PEARLITIC GREY CAST IRON

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F.B. RICE & CO.

(56) Prior Art Documents
AU 1441280 65119/69 15.8
GB 1132056

(57) Claim

1. A process for the manufacture of cast iron high in pearlite content, comprising producing a molten mass of cast iron in a storage and pouring device, pouring said molten mass from said storage and pouring device directly into a casting mold, introducing a pearlite stabilizing agent into said molten mass while it is being freely poured from said storage and pouring device into said casting mold, said pearlite stabilizing agent comprising a pearlite stabilizing substance and an inoculant said pearlite stabilizing substance comprising tin or antimony, said pearlite stabilizing substance and said inoculant being introduced together into said molten mass.

2. The process of claim 1 wherein said pearlite stabilizing agent is selected from the group consisting of tin and antimony.

5. The process of claim 1 wherein said pearlite stabilizing agent is in the form of a wire.

6. The process of claim 1 wherein said pearlite stabilizing agent is in the form of a powder.

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12. The process of claim 1 wherein said cast iron high in pearlite content comprises grey cast iron, modular cast iron or vermicular cast iron.

15. A pearlite stabilizing agent in wire form comprising an inoculant in powder form enveloped by a ^{casing}~~casting~~ made from a pearlite stabilizing substance selected from the group consisting of tin and antimony.

16. A pearlite stabilizing agent in wire form comprising an inoculant in powder form enveloped by a casing, and a pearlite stabilizing substance applied as a layer to said casing, said pearlite stabilizing substance being selected from the group consisting of tin and antimony.

17. A pearlite stabilizing agent in wire form comprising a pearlite stabilizing substance in the form of wire embedded in a powdered inoculant enveloped by a casing, said pearlite stabilizing substance being selected from the group consisting of tin and antimony..

Patent Act 1952

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Lodged : _____

Accepted :

Published :

This document contains the amendments made under Section 49 and is correct for printing.

Related Art :

Name of Applicant : GEORG FISCHER AKTIENGESELLSCHAFT

Address of Applicant : CH-8201 Schaffhausen, Switzerland.

Actual Inventor/~~xx~~ : Ivo Henych

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28A Montague Street,
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Complete Specification for the invention entitled:

Process for the production of pearlitic cast iron

The following statement is a full description of this invention including the best method of performing it known to us/ us:-

Background of the Invention

The present invention relates to a process for the production of cast iron high in pearlite content, for example, grey cast iron, nodular cast iron "GGG", and
5 vermicular cast iron "GGV".

Heretofore, it has been known to produce pearlite GG, GGG and GGV cast iron by adding a pearlite stabilizing agent, for example, copper, into the molten cast iron mass while the molten mass is in a smelting furnace or in a
10 ladle. This treatment is done especially when the molten mass of cast iron is poured directly into a casting mold from an automatic smelting furnace or from a stopper ladle. However, there are several drawbacks to this procedure when the same pouring/holding furnace is used
15 for the production of cast iron high in pearlite values as well as for the production of cast iron high in ferritic values. Each time it is desired to change over from the production of pearlite cast iron to ferritic cast iron, it is necessary to completely empty the cast iron furnace.
20 This is because if any pearlite stabilizing agents remain in the furnace, they would have a negative effect on the production of cast iron which is high in ferritic values. However, it is a time consuming process to completely empty a pneumatically operated casting furnace. In
25 addition, it may be necessary to stop the entire casting line while the emptying takes place.

It is therefore desirable to provide a process for producing pearlite cast iron which does not require the smelting furnace or ladle to be completely emptied when
30 changing over from the production of pearlite cast iron.



Summary of the Invention

The aforementioned problem is solved by the present invention which comprises a process for the manufacture of cast iron high in pearlite content, comprising producing a
5 molten mass of cast iron in a storage and pouring device, pouring said molten mass from said storage and pouring device directly into a casting mold, introducing a pearlite stabilizing agent into said molten mass while it is being freely poured from said storage and pouring
10 device into said casting mold, said pearlite stabilizing agent comprising a pearlite stabilizing substance and an inoculant said pearlite stabilizing substance comprising tin or antimony, said pearlite stabilizing substance and said inoculant being introduced together into said molten
15 mass.

Further advantageous embodiments of the present invention are described hereinbelow.



Detailed Description of Preferred Embodiments

5 In its broadest scope, the process according to the
~~instant~~^{present} invention comprises adding at least one pearlite
stabilizing agent into the mass of molten cast iron while the
mass is being transferred from a casting furnace or a casting
ladle into the interior of a casting mold. Preferably, the
pearlite stabilizing agent is added into the pouring stream of
the molten cast iron. In this way the melting and casting
10 structures are not exposed to contamination by the pearlite
stabilizing agents.

15 Because the pearlite stabilizing agent is added to the
molten mass after it has been removed from its source of heat,
it is important that the pearlite stabilizing agent not place
too great a thermic burden upon the pouring stream.
Accordingly, it is desirable that the pearlite stabilizing
agent comprise tin (Sn) or antimony (Sb) which are required in
considerably smaller quantities than copper (Cu). This ensures
20 that the added quantity of pearlite stabilizing agent, and an
inoculant which may also be added, are melted down immediately
and evenly upon introduction into the pouring stream. This
quick melting down is also facilitated by the low melting
temperatures and the low specific heat values of Sn and Sb as
25 compared with Cu.

The following examples will further illustrate the
inventive process.



Example 1

For the production of the nodular cast iron known as GGG 50, normally 0.3% Cu is added to a cast iron melt as an alloy to achieve the necessary pearlite contents. When scrap iron, generally thought to contain less than 0.1% Cu, is melted, an addition of only approximately 0.015% Sn is required to achieve the necessary pearlite values. Thus, 0.015% Sn is the functional equivalent of 0.2% Cu.

Example 2

For the production of the nodular cast iron known as GGG 60, normally 0.5 to 0.7% Cu is added to a cast iron melt to achieve the necessary pearlite contents. Under the same conditions as in example 1, an addition of approximately .015% Sb is needed to achieve the necessary pearlite value, thus replacing 0.4 to 0.6% Cu.

The pearlite stabilizing agents such as Sn and/or Sb can be added in the form of a powder, a wire, or as a wire comprising a powder of Sn and/or Sb enveloped by means of a metallic or non-metallic casing. The Sn or Sb can be added in combination with an inoculant, e.g., FeSi. Such a combination of the pearlite stabilizing agent and inoculant can be formed as a powder mixture, which is blown into the melt, or as an alloy. The combination can also be formed as a wire comprising

the powder mixture enveloped by means of a metallic or non-metallic casing. Also, the inoculant in powder form can be enveloped in a metallic casing on which Sb or Sn is applied on the outside or inside surfaces of the casing.

- 5 In another variation, a pearlite stabilizing agent in wire form comprising, the inoculant in powder form enveloped by a casing made from Sn or Sb. In a further embodiment, the addition of Sn or Sb into the pouring stream in the form of a wire embedded in a powder inoculant which is
- 10 enveloped by a casing made of a metallic or non-metallic material.

The use of Sb as the pearlite stabilizing agent is especially advantageous since the boiling temperature of Sb is at 1,140°C, which is lower than the normal

- 15 temperature of the



~~the powder mixture enveloped by means of a metallic or non-~~
metallic casing. Also, the inoculant in powder form can be
enveloped in a metallic casing on which Sb or Sn is applied on
the outside or inside surfaces of the casing. As another
5 variation, a wire comprising the inoculant in the form of a
powder enveloped by a casing made from Sn or Sb can be used.
As yet another possibility, the addition product of Sn or Sb
can be introduced into the pouring stream in the form of a wire
embedded in a powder inoculant which is enveloped by a casing
10 made of a metallic or non-metallic material.

The use of Sb as the pearlite stabilizing agent is
especially advantageous since the boiling temperature of Sb is
~~at 1,140° C, i.e., lower than the normal temperature of the~~
molten mass before treatment. Thus, it is relatively easy to
15 conver' from the production of pearlitic to ferritic cast irons
as Sb residues that may be left behind evaporate during the
melting process and do not affect the production of cast iron
which is high in ferritic values.

20 A special advantage of the described process is the
possibility of producing ferritic and pearlitic cast iron
qualities in one and the same smelting furnace and casting
furnace arrangement, without interruption of production in
order to completely empty out these units. In this case, the
25 risk that remaining residues of pearlite stabilizing agents may
affect the subsequent production of ferritic cast iron is
eliminated. The addition of Sn or Sb together with the
inoculant in the described wire form into the pouring stream is



very advantageous because precise dosing of Sn or Sb is possible.

~~While the invention has been described by reference to~~
5 specific embodiments, this was for purposes of illustration
only and should not be construed to limit the spirit or the
~~scope of the invention.~~



THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A process for the manufacture of cast iron high in pearlite content, comprising producing a molten mass of cast iron in a storage and pouring device, pouring said molten mass from said storage and pouring device directly into a casting mold, introducing a pearlite stabilizing agent into said molten mass while it is being freely poured from said storage and pouring device into said casting mold, said pearlite stabilizing agent comprising a pearlite stabilizing substance and an inoculant said pearlite stabilizing substance comprising tin or antimony, said pearlite stabilizing substance and said inoculant being introduced together into said molten mass.
2. The process of claim 1 wherein said pearlite stabilizing agent is selected from the group consisting of tin and antimony.
3. The process of claim 1 wherein said pearlite stabilizing agent comprises tin.
4. The process of claim 1 wherein said pearlite stabilizing agent comprises antimony.
5. The process of claim 1 wherein said pearlite stabilizing agent is in the form of a wire.
6. The process of claim 1 wherein said pearlite stabilizing agent is in the form of a powder.
7. The process of claim 1 wherein said pearlite stabilizing agent is in the form of a wire comprising a pearlite stabilizing substance in powder form enveloped by a casing made from a metallic or non-metallic material.
8. The process of claim 1 wherein said pearlite stabilizing agent is in the form of a wire comprising a pearlite stabilizing substance and an inoculant in powder form enveloped by a casing made from a metallic or a non-metallic material.
9. The process of claim 1 wherein said pearlite stabilizing agent comprises an inoculant in powder form



enveloped by a casing made from a pearlite stabilizing agent.

10. The process of claim 1 wherein said pearlite stabilizing agent comprises an inoculant in powder form enveloped by a casing and a pearlite stabilizing substance applied as a layer to said casing.

11. The process of claim 1 wherein said pearlite stabilizing agent comprises a pearlite stabilizing substance in the form of a wire embedded in an inoculant in powder form, said powder being enveloped by a casing.

12. The process of claim 1 wherein said cast iron high in pearlite content comprises grey cast iron, modular cast iron or vermicular cast iron.

13. A pearlite stabilizing agent in wire form comprising a pearlite stabilizing substance in powder form enveloped by a casing, said pearlite stabilizing substance being selected from the group consisting of tin and antimony.

14. The pearlite stabilizing agent of claim 13 further comprising an inoculant in powder form enveloped by said casing.

15. A pearlite stabilizing agent in wire form comprising an inoculant in powder form enveloped by a ~~casing~~^{casing} made from a pearlite stabilizing substance selected from the group consisting of tin and antimony.

16. A pearlite stabilizing agent in wire form comprising an inoculant in powder form enveloped by a casing, and a pearlite stabilizing substance applied as a layer to said casing, said pearlite stabilizing substance being selected from the group consisting of tin and antimony.

17. A pearlite stabilizing agent in wire form comprising a pearlite stabilizing substance in the form of wire embedded in a powdered inoculant enveloped by a casing, said pearlite stabilizing substance being selected from the group consisting of tin and antimony..



18. A process substantially as hereinbefore defined with reference to any one of the accompanying examples.

19. A stabilizing agent substantially as hereinbefore defined with reference to any one of the accompanying examples.

DATED this 31st day of October 1989

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Applicant:

F.B. RICE & CO.

