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COMMONWEALTH of AUSTRALIA
Patents Act 1952

APPLICATION FOR A STANDARD PATENT

I/We

Saarbergwerke Aktiengesellschaft

of

Trierer Strasse 1, D-6600 Saarbrücken, Federal Republic of Germany

hereby apply for the grant of a Standard Patent for an invention entitled "Process and apparatus for continuous stroke monitoring in a tamping process".

which is described in the accompanying complete specification.

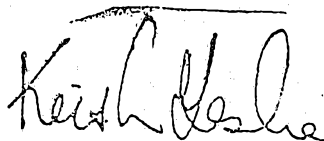
Details of basic application(s):-

<u>Number</u>	<u>Convention Country</u>	<u>Date</u>
P39 10 214.9-24	Federal Republic of Germany	30 March 1989

The address for service is care of DAVIES & COLLISON, Patent Attorneys, of 1 Little Collins Street, Melbourne, in the State of Victoria, Commonwealth of Australia.

DATED this TWENTY EIGHTH day of MARCH 1990

To: THE COMMISSIONER OF PATENTS



.....
a member of the firm of
DAVIES & COLLISON for
and on behalf of the
applicant(s)

Davies & Collison, Melbourne



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COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

DECLARATION IN SUPPORT OF CONVENTION OR NON-CONVENTION APPLICATION FOR A PATENT

Insert title of invention.

In support of the Application made for a patent for an invention
entitled: "Automatic stroke monitoring during the
tamping process"

Insert full name(s) and address(es)
of declarant(s) being the appli-
cant(s) or person(s) authorized to
sign on behalf of an applicant
company.

K
We Wilhelm Lahann and Walter Lehnert
of Saarbergwerke AG
of Trierer Strasse 1
D-6600 Saarbrücken
Federal Republic of Germany

Cross out whichever of paragraphs
1(a) or 1(b) does not apply

1(a) relates to application made
by individual(s)

1(b) relates to application made
by company; insert name of
applicant company.

do solemnly and sincerely declare as follows :-

1. (a) ~~XXXX~~ be applicant ~~XXXX~~ for the patent.
We are ~~XXXX~~

or (b) ~~XXXX~~ authorized by

Saarbergwerke AG

Cross out whichever of paragraphs
2(a) or 2(b) does not apply

2(a) relates to application made
by inventor(s)

2(b) relates to application made
by company(s) or person(s) who
are not inventor(s); insert full
name(s) and address(es) of inven-
tors.

the applicant..... for the patent to make this declaration on ~~their~~ its behalf.

2. (a) ~~XXXX~~ the actual inventor ~~XXXX~~ of the invention
~~XXXX~~

or (b)

Manfred BRANDSTETTER of
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AND

Dieter BALLAS of
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BOTH OF FEDERAL REPUBLIC OF GERMANY

~~XXXX~~ the actual inventor(s)..... of the invention and the facts upon which the applicant.....

~~XXXX~~ is
~~XXXX~~ entitled to make the application are as follows :-

The applicant would if a patent were
granted on an application made by the
said actual inventor, be entitled to
have the patent assigned to it.

State manner in which applicant(s)
derive title from inventor(s)

Cross out paragraphs 3 and 4
for non-convention applications.
For convention applications,
insert basic country(s) followed
by date(s) and basic applicant(s).

3. The basic application..... as defined by Section 141 of the Act ~~was~~ made
in Federal Republic of Germany on the 30th March 1989
by Saarbergwerke AG.....
in on the
by
in on the
by

4. The basic application..... referred to in paragraph 3 of this Declaration ~~was~~
the first application..... made in a Convention country in respect of the invention the subject
of the application. ~~XXXX~~

Insert place and date of signature.

Declared at Saarbrücken this 4th day of April 1990
SAARBERGWERKE AKTIENGESellschaft

Signature of declarant(s) (no
attestation required)

i.A. i.A.

Note Initial all alterations.

Wilhelm Lahann *Walter Lehnert*
Wilhelm Lahann Walter Lehnert

DAVIES & COLLISON, MELBOURNE and CANBERRA.

(12) PATENT ABRIDGMENT (11) Document No. AU-B-52318/90
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 626397

(54) Title
PROCESS AND APPARATUS FOR CONTINUOUS STROKE MONITORING IN A TAMPING PROCESS

International Patent Classification(s)
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(56) Prior Art Documents
EP 272957

(57) Claim

1. Process for the continuous monitoring of the stroke of a tamping rod of a tamping machine for the production of a compacted coal cake in a coking plant, wherein upward and/or downward movement of the tamping rod causes rotation of a rotatable body placed in contact with the tamping rod and the rate of rotation of the rotatable body is measured and continuously compared with a predetermined set value.

5. Apparatus for the continuous stroke monitoring of a tamping rod of a tamping machine for the production of a compacted coal cake comprising a rotatable body and a sensor bracketed in a fixed relationship thereto and means for suspending the rotatable body in resilient contact with the tamping rod such that, in use, upward and/or downward movement of the tamping rod causes rotation of the rotatable body, the rotation being detected by the sensor, and wherein the suspension means permits horizontal movement of the rotatable body due to random horizontal movement of the tamping rod.

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COMPLETE SPECIFICATION

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1 Little Collins Street, Melbourne, 3000.

COMPLETE SPECIFICATION FOR THE INVENTION ENTITLED: Process and
apparatus for continuous stroke monitoring in a tamping process".

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



-1a-

The invention refers to a process and a device for the continuous monitoring of the stroke of the tamping rod of a tamping machine for the production of a compacted coal cake in a coking plant.

To improve the coke quality coals certain coking coals are compacted in a tamping mould with the aid of a large number of free-falling tampers before feeding them into the coking chamber. Then the coal cake is pushed into the empty coking furnace.

For an interruption-free operation of a tamping machine it is important, that all tampers could be moved out of the mould after the completion of the tamping process without damaging the coal cake.

It is necessary to continuously monitor the movement process of each tamper, as there is the danger that stationary tampers will be tamped into the coal cake. Until now the employment of the tamping machine operators was necessary, who monitored the process and controlled it accordingly by visually checking it.

The preferred object of the invention is to develop a process and a device, which enables a continuous monitoring of the tamping rod.

According to a first aspect of the present invention there is provided a process for the continuous monitoring of the stroke of a tamping rod of a tamping machine for the production of a compacted coal cake in a coking plant, wherein upward and/or downward movement of the tamping rod causes rotation of a rotatable body placed in contact with the tamping rod and the rate of rotation of the rotatable body is measured and continuously compared with a predetermined set value.



According to a second aspect of the present invention there is provided an apparatus for the continuous stroke monitoring of a tamping rod of a tamping machine for the production of a compacted coal cake comprising a rotatable body and a sensor bracketed in a fixed relationship thereto and means for suspending the rotatable body in resilient contact with the tamping rod such that, in use, upward and/or downward movement of the tamping rod causes rotation of the rotatable body, the rotation being detected by the sensor, and wherein the suspension means permits horizontal movement of the rotatable body due to random horizontal movement of the tamping rod.

The use of a process control computer is preferably used to register and evaluate the further measured values and then program the progress of the process.

It has been found in a preferred embodiment of the invention, that due to the low rotational resistance of the body of rotation a low friction is required only between the tamping rod and the body of rotation. This can be produced in a simple manner by conventional means, for example, by a spring force. A possible slight slip still occurring between the body of rotation and the tamping rod does not lead to any appreciable distortion of the measuring and can be tolerated without any problem.

When the predetermined minimum number of revolutions of impulses and/or impulses per time unit is no longer produced due to stoppage or strongly decelerating movement of a tamping rod, this is signalled on a control panel and the coal supply is shut off immediately.

If after an adjustable delay time the progress of the movement of the tamping rod does not return to normal,



the fall brakes the tamping rod will be clamped. The tamping motors will run until all tamping rods are detained in the top position.

By this it will be ensured, that slight irregularities in the movement process or when the movement process is recorded do not lead to a a stoppage, however, on the other hand, no tamper is tamped into the coal cake.

During the application of the process in accordance with embodiments of the invention the following advantages have become apparent.

1. Due to the automatically monitored tamping a considerably more homogeneous density of the coal cake is achieved. Because of this, during the feeding of the coal cake into the coking furnace considerably fewer breakages of the cakes occur, the production process is interrupted less frequently. In addition, the dynamic loading of the tamping machine construction is reduced. Interruptions on the machine are reduced.



2. Due to the even tamping, including on the surface of the coal cake, a good compacting is achieved here also. When the filling gas is evacuated, fewer coal particles are dragged along and consequently the combustion in the filling gas combustion car is markedly improved.

3. The automatic device prevents that the distance blocks (without coal supply) would be tamped for too long. By this a considerable noise reduction and a shorter duration of the noise effect is achieved.

In the following the invention will be explained based on an embodiment schematically illustrated in Figs.1 and 2. On this occasion the same reference numbers are used for the same parts of the device.

Shown is:

in Fig.1 - the arrangement of the plastic roller 1 and of the inductive measurement value sensor 2 on the tamping rod 3.

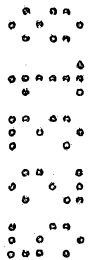
in Fig.2 - a section across the plastic roller 1 and of the tamping rod 2.

Two metallic bodies 4 a/b are arranged in the web 6 of a plastic roller so, that during the rotation of the plastic roller they pass in front of an inductive measurement value sensor 2.

The plastic roller 1 and the inductive measured value sensor 2 are fixed together in a bracket 11 and are flexibly suspended by means of an elastomeric element 8 on a holder 7. Consequently, the position of the plastic roller 1 can adjust itself to suit the horizontal unevenness during the movement process of the tamping rod 3.

The running surface 10 of the plastic roller 1 and the web 5 of the tamping rod are fitted with friction lining 9 a/b to enable the secure transfer of the forces necessary to drive the plastic roller 1.

To improve the running properties, the hub 13 of the plastic roller 1 can be provided with a metallic sleeve and with plain or anti-friction bearings. The impulses are transmitted through the lead 12 for evaluation.



THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. Process for the continuous monitoring of the stroke of a tamping rod of a tamping machine for the production of a compacted coal cake in a coking plant, wherein upward and/or downward movement of the tamping rod causes rotation of a rotatable body placed in contact with the tamping rod and the rate of rotation of the rotatable body is measured and continuously compared with a predetermined set value.
2. Process as claimed in claim 1, wherein the rotatable body comprises a plastics roller having at least one body attached thereto which during the rotation of the rotatable body passes and is detected by sensor means which issue a signal indicative of the rotation of the roller.
3. Process as claimed in claim 2, wherein the at least one body and the sensor means are adapted to measure the rotation of the rotatable body by induction.
4. Process as claimed in any one of claims 1 to 3, wherein the comparison with the predetermined set value is computer controlled.
5. Apparatus for the continuous stroke monitoring of a tamping rod of a tamping machine for the production of a compacted coal cake comprising a rotatable body and a sensor bracketed in a fixed relationship thereto and means for suspending the rotatable body in resilient contact with the tamping rod such that, in use, upward and/or downward movement of the tamping rod causes rotation of the rotatable body, the rotation being detected by the sensor, and wherein the suspension means permits horizontal movement of the rotatable body due to random horizontal movement of the tamping rod.



6. Apparatus as claimed in claim 5, wherein the rotatable body includes at least one sensor detectable formation which is arranged to pass the sensor during rotation of the rotatable body and wherein the sensor issues a signal indicative of the rotation whenever such a formation passes the sensor.

7. Apparatus as claimed in claim 6, wherein the sensor and formation are constituted so as to register the rotation of the rotatable body by induction.

8. Apparatus as claimed in any one of claims 6 or 7 further comprising computer means programmed to evaluate the signals passed by the sensor and to determine whether the tamping rod moves according to a predetermined pattern of tamping movement.

9. Apparatus as claimed in any one of claims 5 to 8 wherein the apparatus is adapted to automatically shut off coal supply to the tamping machine in the event of the movement of the tamping rod departing from preset limits.

10. Process for monitoring of the stroke of a tamping rod of a tamping machine for the production of a compacted coal cake in a coking plant substantially as hereinbefore described with reference to the accompanying drawings.

11. Apparatus for monitoring a tamping rod of a tamping machine for the production of a compacted coal cake in a coking plant substantially as hereinbefore described with reference to the accompanying drawings.

12. Coke making plant adapted for the process as claimed in any one of claims 1-4 and 10.



13. Coke making plant including the apparatus as claimed in any one of claims 5-9 and 11.

14. Coke when manufactured by the process as claimed in any one of claims 1-4 and 10.

15. Coke when manufactured by the apparatus as claimed in any one of claims 5-9 and 11.

DATED this 8th day of May 1992
Saarbergwerke Aktiengesellschaft
By Its Patent Attorneys
DAVIES COLLISON CAVE



FIG. 1

52318/90

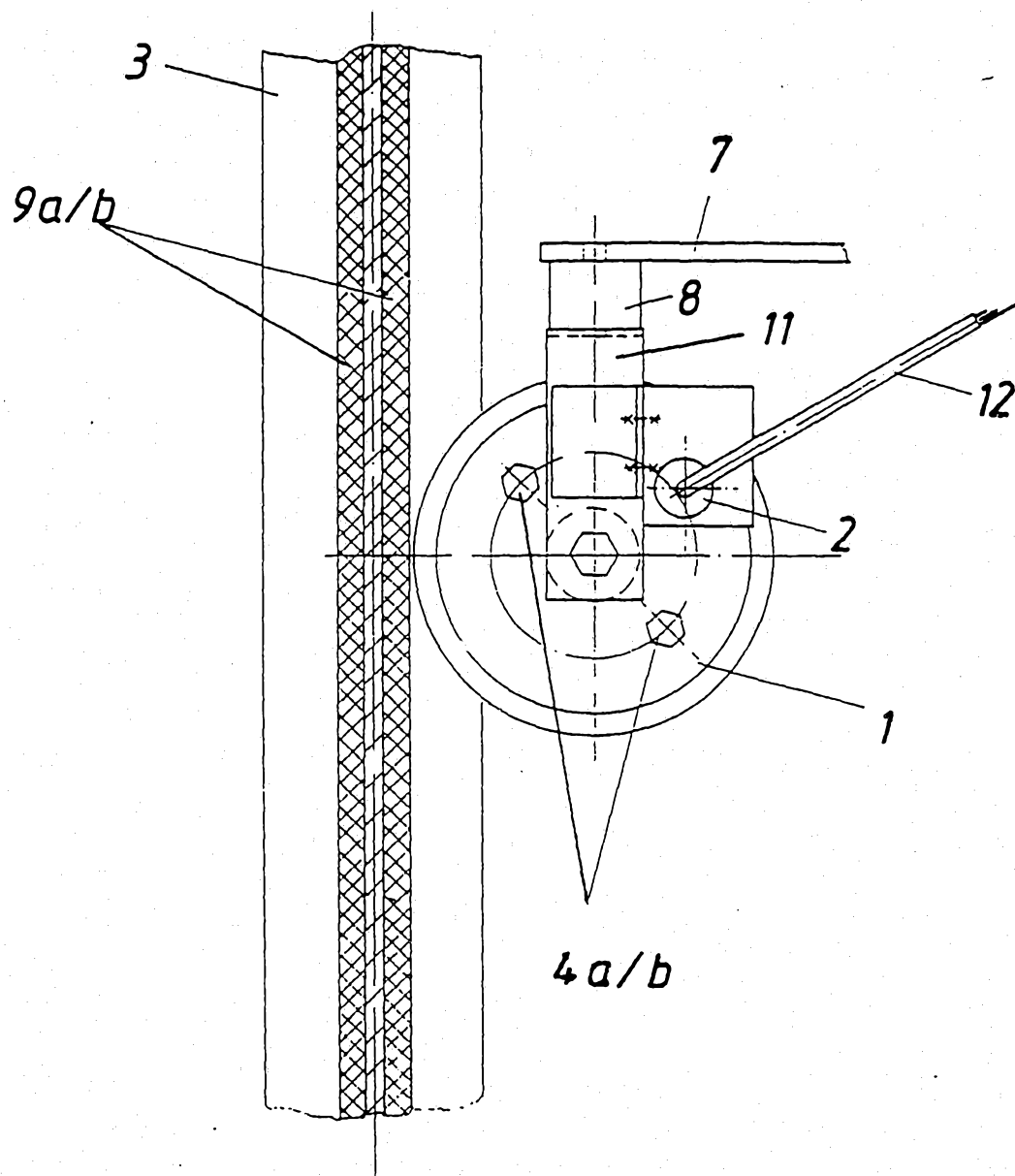


FIG. 2

