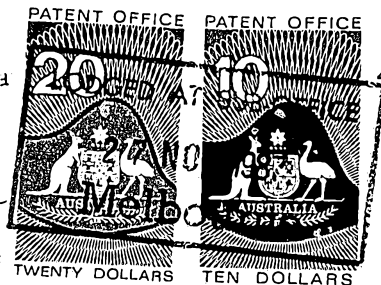
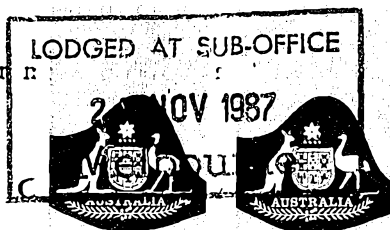


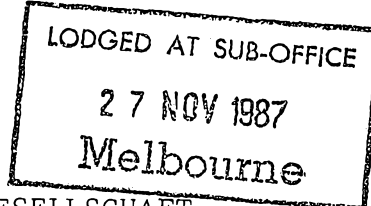
(CONVENTION. By one or more

594535



CONVENTION APPLICATION FOR A PATENT

FEE STAMP TO VALUE OF
\$ 130 ATTACHED
MAIL OFFICER: *[Signature]*



81871/87

(1) Here insert (in full) Name or Names of Applicant or Applicants, followed by Address (es).

k (1) METALLGESELLSCHAFT AKTIENGESELLSCHAFT

We

of Reuterweg 14, D-6000 Frankfurt/Main 80, Federal Republic of Germany

APPLICATION ACCEPTED AND AMENDMENTS

ALLOWED 4-1-90

(2) Here insert Title of Invention.

hereby apply for the grant of a Patent for an invention entitled: (2)

PROCESS OF BURNING HIGH-SALT COAL

(3) Here insert number(s) of basic application(s)

which is described in the accompanying complete specification. This application is a Convention application and is based on the application numbered (3)

P36 40 908.1

(4) Here insert Name of basic Country or Countries, and basic date or dates

for a patent or similar protection made in (4) Federal Republic of Germany on 29th November 1986

MM
Our

address for service is Messrs. Edwd. Waters & Sons, Patent Attorneys, 50 Queen Street, Melbourne, Victoria, Australia.

DATED this 27th day of November 1987

(5) Signature (s) of Applicant (s) or Seal of Company and Signatures of its Officers as prescribed by its Articles of Association.

(5)

METALLGESELLSCHAFT AKTIENGESELLSCHAFT

BY

Wayne McMaster
Wayne McMaster

Registered Patent Attorney

To:

THE COMMISSIONER OF PATENTS.

(CONVENTION. Company.)

Form 8

COMMONWEALTH OF AUSTRALIA

Patents Act 1952-1969

DECLARATION IN SUPPORT OF A CONVENTION
APPLICATION FOR A PATENT OR PATENT OF ADDITION(1) Here
insert (in
full) Name of
Company.In support of the Convention Application made by⁽¹⁾.....
METALLGESELLSCHAFT AKTIENGESELLSCHAFT(2) Here
insert title
of Invention.(hereinafter referred to as the applicant) for a Patent
for an invention entitled:⁽²⁾..... PROCESS OF BURNING HIGH-
SALT COAL(3) Here
insert full Name
and Address,
of Company
official
authorized
to make
declaration.WE ~~X~~⁽³⁾ ANNELIESE GASTEYER and WOLFGANG SCHNEIDER, both
of Reuterweg 14, D-6000 Frankfurt/Main, Federal Republic
of Germany
do solemnly and sincerely declare as follows:1. ~~We are~~^{We are} authorised by the applicant for the patent
to make this declaration on its behalf.2. The basic application as defined by Section 141 of the Act was
made in⁽⁴⁾ Federal Republic of Germany
on the 29th day of November 1986, by
METALLGESELLSCHAFT AKTIENGESELLSCHAFT~~on the~~ ~~day of~~ ~~1986~~ by(4) Here
insert basic
Country or
Countries
followed by
date or dates
and basic
Applicant or
Applicants.(5) Here
insert (in
full) Name
and Address
of Actual
Inventor or
Inventors.3.⁽⁵⁾ GURUDAS SAMANT, Zur Schmiede 1, D-3555 Eronhausen,
and CARL HAFKE, Waldecker Strasse 19, D-6000 Frankfurt AM
Main 50, both of Federal Republic of Germanyis/are the actual inventors of the invention and the facts upon which the applicant
is entitled to make the application are as follow:

The applicant is the assignee of the said actual inventors

4. The basic application referred to in paragraph 2 of this Declaration
was.....the first application made in a Convention country in
respect of the invention the subject of the application.DECLARED at Frankfurt am Main,
this 30th day of November 1989Metallgesellschaft
Aktiengesellschaft

(12) PATENT ABRIDGMENT (11) Document No. AU-B-81871/87
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 594535

(54) Title
PROCESS OF BURNING HIGH-SALT COAL

International Patent Classification(s)
(51)^a C10L 009/10

(21) Application No. : 81871/87 (22) Application Date : 27.11.87

(30) Priority Data

(31) Number	(32) Date	(33) Country
3640908	29.11.86	DE FEDERAL REPUBLIC OF GERMANY

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(71) Applicant(s)
METALLGESELLSCHAFT AKIENGESELLSCHAFT

(72) Inventor(s)
GURUDAS SAMANT; CARL HAFKE

(74) Attorney or Agent
WATERMARK MELBOURNE

(56) Prior Art Documents
AU 81675/82 C10L

(57) Claim

1. A process of burning high-salt coal which has a chlorine content of at least 5 % by weight and has in the ash of the coal a total content of at least 10 % by weight of alkali chloride and alkali sulfate, wherein the coal has particle sizes below 12 mm and the ash has a melting point not in excess of 800°C, characterized in that the coal particles are at least partly covered with at least one oxide, hydroxide, carbonate or sulfate of calcium or magnesium and the covered coal is burnt in a fluidized bed, in a circulating fluidized bed or in a multiple-hearth furnace at temperatures having a maximum in excess of the melting point of the ash of the untreated coal.

COMMONWEALTH OF AUSTRALIA
PATENTS ACT 1952-69

594535^{orm}

COMPLETE SPECIFICATION

(ORIGINAL)

Class

Int. Class

Application Number:
Lodged:

Complete Specification Lodged:

Accepted:

Published:

Priority:

Related Art:

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1969 JUN 11 10 11 AM
AUSTRALIAN PATENT OFFICE

Name of Applicant: METALLGESELLSCHAFT AKTIENGESELLSCHAFT

Address of Applicant: Reuterweg 14, D-6000 Frankfurt/Main, Federal Republic of Germany

Actual Inventor: GURUDAS SAMANT and CARL HAFKE

Address for Service: EDWD. WATERS & SONS,
50 QUEEN STREET, MELBOURNE, AUSTRALIA, 3000.

Complete Specification for the invention entitled:

PROCESS OF BURNING HIGH-SALT COAL

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

DESCRIPTION

5 This invention relates to a process of burning high-salt coal which has a chlorine content of at least 5% by weight and has in the ash of the coal a total content of at least 10% by weight of alkali chloride and alkali sulfate, wherein the coal has particle sizes below 12 mm and the ash has a melting point not in excess of 800°C.

10 The combustion of such high-salt coal, which contains ash having a very low melting point, will result in a melting of the ash. This gives rise to difficulties in process technology, particularly during a combustion in a fluidized bed, a circulating fluidized bed, or a multiple-hearth furnace.

14 German Patent 1,546,630 discloses a process of burning high-salt coal in a pulverized-coal furnace. The finely ground coal is first degasified by a partial combustion in the presence of added kaolin for combining with alkali. Said operations are performed at temperatures of about 1000°C. Slag is withdrawn in a liquid state. In that known process the volatilization of alkalis is reduced so that less alkalis will be deposited on surfaces disposed outside the combustion chamber. The alkalis combine with the added kaolin to form aluminum alkali silicates. But a release of substantial quantities of chlorine and sulfur is not prevented. This gives rise to great corrosion problems in the succeeding parts of the plant.

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German Patent Publication 25 01 503 describes a process of decreasing the sulfur content of

the exhaust gases from fluidized bed furnaces. The granular coal is covered with dolomite or limestone and during the combustion the sulfur contained in the coal is reacted to form CaSO_3 and CaSO_4 and is thus combined. That publication discloses also an addition of lime to suspended coal fuel in order to reduce the melting temperature of the ash.

It is an object of the invention to effect an economical combustion of high-salt coal without a risk of disturbances caused by the low melting point of the ash. In the process described first hereinbefore this is accomplished in accordance with the invention in that the coal particles are at least partly covered with at least one oxide, hydroxide, carbonate or sulfate of calcium or magnesium and the covered coal is burnt at temperatures having a maximum in excess of the melting point of the ash of the untreated coal.

It has been found that the substances stated will effect a sufficient increase of the melting point of the ashes of said coals so that said ashes will not melt if sufficiently low combustion temperatures are maintained.

An increase of the amount of impregnating material applied to the coal particles will increase the temperature at which the ash is melted. As a rule of thumb it can be said that at least two moles of the impregnating substances should be used per mole of sodium chloride in the coal. Dolomite may also be used as an impregnating substance.

The high-salt coal can be covered or

impregnated, e.g., in a mixer, a tumbling barrel or a pelletizing barrel. In such equipment, the coal particles may be contacted with an aqueous suspension of the impregnating material or may be moistened on the surface and may then be contacted with the dry impregnating material. The impregnating granular coal may be formed into shaped bodies, such as briquettes or pellets, and said shaped bodies can then be supplied to the burning equipment.

Preferred combustion temperatures are in the range from 650 to 850 °C. In said temperature range the NaCl vapor pressure is not in excess of 1.3 millibars so that there is no risk of a deposition of salt in the equipment which succeeds the burning equipment. Besides, the impregnation of the coal particles will substantially prevent an evolution of NaCl vapors during the combustion. The combustion is effected in equipment which is known per se, e.g., in a fluidized bed, a circulating fluidized bed or a multiple-hearth furnace. A combustion in a circulating fluidized bed has been described in Published German Applications 25 39 546 and 26 24 302 and in the corresponding U.S. Patents 4,165,717 and 4,111,158.

For a combustion of the impregnated coal in a circulating fluidized bed, an addition of granular inert material having particle sizes below 3 mm is recommended. A particularly desirable inert material consists of furnace ash. Such inert material will improve the trickling of the ash. The inert material is preferably added in a quantity of 2 to 20 % by weight of the ash content of the untreated high-salt coal.

In the following examples, two different high-salt coals from the German Democratic Republic have

been used. Said coals had particle sizes up to 12 mm and the following properties:

<u>Analysis, based on dry coal</u>	<u>Coal A</u>	<u>Coal B</u>
Ash (at 500°C), % by weight	11.8	14.7
Total carbon, % by weight	51.4	52.5
Total sulfur, % by weight	2.4	2.2
Hydrogen, % by weight	6.0	5.7
Chlorine	1.7	3.8
Nitrogen	0.4	0.4
Upper heating value, kJ/kg	21,180	22,230
Lower heating value, kJ/kg	19,860	20,980
Melting point of ash, °C	705	700

The melting point of ash is measured using a sample of 3 mm x 3 mm in a heating microscope.

The ash produced at 500°C had the following composition:

	<u>From Coal A % by weight</u>	<u>From Coal B % by weight</u>
Na ₂ O	19.2	24.6
CaO	14.6	10.5
SiO ₂	1.5	0.6
MgO	2.4	1.9
Al ₂ O ₃	0.7	0.8
Fe ₂ O ₃	2.9	0.5
K ₂ O	0.3	0.4
TiO ₂	0.05	0.05
SO	38.2	27.7
Cl ³	14.4	25.9
Residual carbon	6.8	8.2

The experiments had the following results:

Example 1

5 200-g portions of coals A and B having particle sizes from 0.1 to 6 mm are burnt without additives in a muffle furnace at 800°C with a supply of air. After the combustion the ash has been entirely melted.

Example 2

10 200-g portions of coals A and B having particle sizes below 6 mm are covered with Ca(OH)_2 in a small tumbling barrel. In the impregnated coals the mole ratio of $\text{CaO}:\text{2NaCl}:\text{Na}_2\text{SO}_4$ is about 3.7:1:1. After the combustion in the muffle furnace at 850°C the ash is loose and loose ash agglomerates are found only at a few points.

Example 3

20 200-g portions of coals A and B are covered with Ca(OH)_2 as in Example 2. In the impregnated coal the mole ratio of $\text{CaO}:\text{2NaCl}:\text{Na}_2\text{SO}_4$ is about 2.8:1:1. The impregnated coal is mixed with 60 g ash from a coal-fired furnace. The main components of said ash consist of 54% by weight SiO_2 , 23.6% by weight Al_2O_3 , 7% by weight Fe_2O_3 and 4% by weight CaO . The combustion is effected at 875°C. After the combustion the ash is loose and does not contain agglomerates.

Example 4

200-g granular coal A are moistened with

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water and covered with CaCO_3 on a small tumbling barrel. In the impregnated coal the mole ratio of $\text{CaO}:\text{2NaCl}:\text{Na}_2\text{SO}_4$ is about 3.7:1:1. The covered coal is mixed with 40 g ash from a coal-fired furnace. The main constituents of that ash were 31.9% by weight SiO_2 , 20% by weight Al_2O_3 , 21.9% by weight CaO , and 4.4% by weight Fe_2O_3 . After a combustion at 900°C the ash is loose and does not contain agglomerates.

Example 5

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200 g of coal B (particle size up to 6 mm) are moistened with water and covered with $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. The mole ratio of $\text{CaSO}_4:\text{2NaCl}:\text{Na}_2\text{SO}_4$ is about 3.5:1:1. After a combustion at 850°C in a muffle furnace the ash is loose and contains no agglomerates.

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Example 6

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1000 g of finely ground coal A (particle size: about 40% by weight below 45 μm) is moistened and mixed with finely ground dolomite. The mole ratio of $(\text{MgO}+\text{CaO}):\text{2NaCl}:\text{Na}_2\text{SO}_4$ in the mixture is 4:1:1. The mixture is first pelletized with an addition of water. The diameter of the pellets is about 10 to 12 mm. When the pellets have been dried at about 100°C in a drying cabinet, the pellets are burnt at 1000°C in a muffle furnace. The ash is loose and contains no agglomerates.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A process of burning high-salt coal which has a chlorine content of at least 5 % by weight and has in the ash of the coal a total content of at least 10 % by weight of alkali chloride and alkali sulfate, wherein the coal has particle sizes below 12 mm and the ash has a melting point not in excess of 800°C, characterized in that the coal particles are at least partly covered with at least one oxide, hydroxide, carbonate or sulfate of calcium or magnesium and the covered coal is burnt in a fluidized bed, in a circulating fluidized bed or in a multiple-hearth furnace at temperatures having a maximum in excess of the melting point of the ash of the untreated coal.
2. A process according to claim 1, characterized in that the covered coal is burnt in the presence of inert granular solids.
3. A process according to claim 1, characterized in that shaped bodies are formed from the covered coal before being burnt.
4. A process according to claim 1, characterized in that the covered coal is burnt at temperatures from 600 to 850°C.

DATED this 13th day of December, 1989

METALLGESELLSCHAFT AG

WATERMARK PATENT & TRADEMARK ATTORNEYS,
"The Atrium", 290 Burwood Road
Hawthorn, Victoria, 3122
AUSTRALIA

SKP/AGB:JJC (2/8)

