COMMONWEALTH OF AUSTRALIA

Patents Act 1952-1969

CONVENTION APPLICATION FOR A PATENT

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

~~We~~ XX(1) DRAGERWERK AKTIENGESELLSCHAFT
of Moislinger Allee 53-55, D-2400 Lubeck, Federal Republic of Germany

(2) Here insert Title of Invention.

hereby apply for the grant of a Patent for an invention entitled:(2) CO_2 ABSORBER MATERIAL

which is described in the accompanying complete specification. This applications is a Covention application and is based on the application numbered:(3) P38 42 048.1

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

(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 14th December 1988

~~My~~ Our address for service is WATERMARK PATENT & TRADEMARK ATTORNEYS 290 Burwood Road, Hawthorn, Victoria, Australia.

DATED this 12th day of December 1989

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

FQ1[illegible]67 13/12/89

(5) DRAGERWERK AKTIENGESELLSCHAFT

by

Ian A. Scott

Registered Patent Attorney

To: THE COMMISSIONER OF PATENTS.

WATERMARK PATENT & TRADEMARK ATTORNEYS

(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) DRÄGERWERK AKTIENGESELLSCHAFT

(hereinafter referred to as the applicant) for a Patent

(2) Here insert title of Invention.

for an invention entitled:(2) CO_2 ABSORBER MATERIAL

(3) Here insert full Name and Address, of Company official authorized to make declaration.

We ~~I~~(3) Dr. Harald Helmreich, Dr. Peter Naumann

of Drägerwerk Aktiengesellschaft
Moislinger Allee 53-55
D-2400 Lübeck

do solemnly and sincerely declare as follows:

1. ~~I am~~ We are authorised by the applicant for the patent to make this declaration on its behalf.

(4) Here insert basic Country or Countries followed by date or dates and basic Applicant or Applicants.

2. The basic application as defined by Section 141 of the Act was made in(4) Federal Republic of Germany on the 14th day of August 19 88, by DRÄGERWERK AKTIENGESELLSCHAFT on the 18th day of August 19 89, by

(5) Here insert (in full) Name and Address of Actual Inventor or Inventors.

3.(5) please see enclosure

~~is~~/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 Lübeck

this 18th day of August 19 89

(6) Signature.

Dr. Harald Helmreich (6) Dr. Peter Naumann

To: THE COMMISSIONER OF PATENTS.

Edwd. Waters & Sons, Melbourne.

Enclosure to Declaration (Form 8)

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(12) PATENT ABRIDGMENT (11) Document No. AU-B-46112/89
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(54) Title
CO2 ABSORBER MATERIAL

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(57) The "respiratory lime" obtained has particularly good properties with respect to cohesiveness and CO_2 absorbing capacity if sodium hexametaphosphate or potassium orthophosphate are used as the salt. These materials are also favourable in terms of their price and in view of the fact that they are physiologically harmless.

Alkaline salts of other oxyacids such as sulphuric acid, permanganic acid, chromic acid and vanadic acid, as well as acidic alkaline salts of orthophosphoric acid, can also be used with similar success.

CLAIM

1. A CO_2 adsorbent mass comprising a kneadable mixture of calcium hydroxide and water and between 0.5 wt.% and 15 wt.% of an alkali salt of an oxyacid from the group consisting of alkaline metal hexametaphosphate and alkaline metal orthophosphate as an additive to increase the strength of the mixture.

621171

Form 10

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952-69

COMPLETE SPECIFICATION

(ORIGINAL)

Class Int. Class

Application Number:
Lodged:

Complete Specification Lodged:
Accepted:
Published:

Priority :

Related Art :

Name of Applicant : DRAGERWERK AKTIENGESELLSCHAFT

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Actual Inventor : CARL ERNST VAN DER SMISSEN, KAI VOM HOFE, HERBERT ROHL and HORST WEZUREK

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Complete Specification for the invention entitled:

CO_2 ABSORBER MATERIAL

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

CO_2 Absorber Material

Absorber materials for CO_2 are known. They are used for bonding exhaled CO_2 in protective respiratory circulatory apparatus, and are called "respiratory lime". "Respiratory lime" consists of calcium hydroxide containing a certain proportion of water, usually 14 to 18%. For increasing reactivity, the known "respiratory lime" contains, at most, a few percent of sodium hydroxide or potassium hydroxide. In order for it to be used in protective respiratory apparatus, the "respiratory lime" must be granulated. The particle size of the granules varies, depending on the intended use, from 2 mm to 8 mm. Very often fractured granules or shaped particles with diameters of about 4 mm are used. The known types of "respiratory lime" have generally good CO_2-bonding properties. However, the granules tend to break when carried in mechanically stressed protective respiratory apparatus, e.g. in escape apparatus, even after a short time, because of their lack of cohesion, whereby the apparatus becomes extremely dusty and its functioning capacity is reduced. The use of the known types of "respiratory lime" in escape apparatus has therefore great risks.

Methods are known for increasing the cohesiveness of "respiratory lime". However, these methods always result in a marked reduction in reactivity. The use of alkali silicates as an additive to calcium hydroxide paste is one such method. Thus, liquid alkali silicates (water glass) effect a strengthening of the structure of the calcium hydroxide particles; however, its porosity is reduced and an outer layer of greatly reduced reactivity is formed on the particles. The result is that, for maintaining a sufficient CO_2 absorption performance, more "respiratory lime" must be used, whereby the protective respiratory apparatus

become larger, heavier and more bulky. In the particular case of an escape apparatus, this is undesirable.

The object of the present invention is to provide additive materials which increase the cohesiveness of "respiratory lime" particles, without impairing the CO_2 absorbing capacity of the "respiratory lime".

This is achieved in that 0.5% by weight to 15% by weight of an alkaline salt (i.e. alkali metal salt or alkaline earth metal salt) of an oxygen-containing acid (i.e. an "oxyacid") is added to the "respiratory lime" paste before granulating to give a kneadable mixture.

Thus, according to the present invention, there is provided a material for absorbing CO_2, comprising a mixture of calcium hydroxide and water, the mixture containing from 0.5% by weight to 15% by weight of an alkaline salt of an oxyacid.

The "respiratory lime" obtained has particularly good properties with respect to cohesiveness and CO_2 absorbing capacity if sodium hexametaphosphate or potassium orthophosphate are used as the salt. These materials are also favourable in terms of their price and in view of the fact that they are physiologically harmless.

Alkaline salts of other oxyacids such as sulphuric acid, permanganic acid, chromic acid and vanadic acid, as well as acidic alkaline salts of orthophosphoric acid, can also be used with similar success.

The invention will now be illustrated by the following Examples.

Example 1

1 kg of calcium oxide was stirred homogeneously with 2 litres of water containing 50 g of sodium hexametaphosphate. After cooling, the highly viscous pulp, in accordance with DE-C-2715635, was placed on a flexible band having hemispherical depressions therein,

and dried in an air drier to a water content of 16%. The "respiratory lime" was then discharged in the form of hemispheres. 600 ml of this "respiratory lime" fulfilled the requirements in respect of CO_2 absorbing capacity, of an absorber of a 15 minute escape apparatus even when the apparatus was previously shaken, corresponding to many years of use as escape apparatus.

Example 2

1 kg of calcium oxide was stirred homogeneously with 2 litres of water containing 60 g of potassium orthophosphate. After cooling, the lime paste was extruded through 6 mm nozzles and then dried. The resulting fibrous "respiratory lime" was broken and sifted to obtain a fraction having a size of 2.5 mm to 4.0 mm. It was then humidified to a water content of 16%. The resulting fractured and granulated "respiratory lime" could be used in the same way as the hemispherical shaped lime described in Example 1.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A CO_2 adsorbent mass comprising a kneadable mixture of calcium hydroxide and water and between 0.5 wt.% and 15 wt.% of an alkali salt of an oxyacid from the group consisting of alkaline metal hexametaphosphate and alkaline metal orthophosphate as an additive to increase the strength of the mixture.

2. A CO_2 adsorbent mass according to claim 1, wherein sodium hexametaphosphate is used as the alkali salt of oxyacid.

3. A CO_2 adsorbent mass according to claim 1, wherein potassium hexametaphosphate is used as the alkali salt of an oxyacid.

4. A CO_2 adsorbent mass according to claim 1, wherein sodium orthophosphate is used as the alkali salt of an oxyacid.

5. A CO_2 adsorbent mass according to claim 1, wherein a potassium orthophosphate is used as the alkali salt of an oxyacid.

6. A CO_2 adsorbent mass substantially as hereinbefore described with reference to the Examples.

Dated this 4th day of November, 1991.

DRAGERWERK AKTIENGESELLSCHAFT

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