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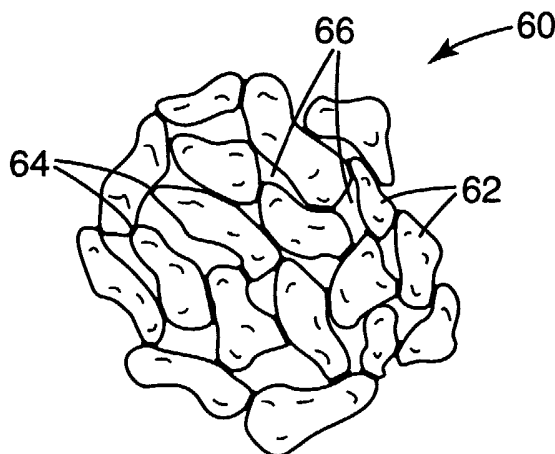
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(54) Title: AGGLOMERATE ABRASIVE GRAIN AND A METHOD OF MAKING THE SAME



(57) Abstract: Agglomerate abrasive grain is disclosed. The agglomerate abrasive grain can be incorporated into abrasive products such as coated abrasives, bonded abrasives, non-woven abrasives, and abrasive brushes. A method of making agglomerate abrasive grain is also disclosed.

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 01/42525

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C09K3/14 B24D3/00 C04B35/10 B24D11/02 B24D3/02
B24D3/04 B24D3/28 B24D3/34 C04B35/111

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C09K C04B B24D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| X | US 5 547 479 A (CONWELL STANLEY L ET AL) 20 August 1996 (1996-08-20) column 2, line 39 -column 7, line 9; claims 1-26 --- | 1-13, 25-37, 138,144 |
| X | US 5 213 591 A (CELIKKAYA AHMET ET AL) 25 May 1993 (1993-05-25) column 16 -column 19; claims 1-27 column 2, line 27 -column 3, line 30 column 3, line 50 -column 4, line 32; figure 3 column 6, line 45-48 column 10, line 22 -column 11, line 7 column 12, line 15-23 --- | 1-13 |
| Y | --- | 14-144 |
| | --- -/-- | |

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

Z document member of the same patent family

Date of the actual completion of the International search

10 February 2003

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24.02.03

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/42525

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Y | US 4 311 489 A (KRESSNER BERNHARDT E) 19 January 1982 (1982-01-19) column 2, line 54 -column 3, line 27; claim 1; figures 1,2; example 1 --- | 1-144 |
| X | US 5 551 963 A (LARMIE HENRY A) 3 September 1996 (1996-09-03) | 1-13 |
| Y | column 7-12; claims 1-18; figures 3-9 --- | 14-144 |
| Y | US 5 908 478 A (WOOD WILLIAM P) 1 June 1999 (1999-06-01) column 8-10; claims 1-55; figure 3; examples 1-5 column 15, line 50 -column 16, line 5 column 18, line 43-62 ----- | 1-144 |

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 01/42525

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-12,13,25-37,138,144

The common subject-matter of these claims comprises a ceramic bonding material having at least 50 wt% crystalline Al₂O₃ and wherein the abrasive particules have an average particle size of at least 5 micron

2. Claims: 14-23,24,38,39-53,79-89,90,123-136,139,143

The common subject-matter of these claims comprises a bonding material having at least 50 wt% Al₂O₃, wherein the abrasive particles have a density of at least 85% of theoretical density and the agglomerate abrasive grain has a porosity value of at least 10%

3. Claims: 54-60,61,91-99,140

The common subject-matter of these claims comprises a bonding material having at least 50 wt% Al₂O₃, wherein the abrasive particles have an average size of less than 10 micron and wherein at least three of the largest abrasive particles have the same volume

4. Claims: 62-69,70,71-77,78,101-110,112-121,141,142

The common subject-matter of these claims comprises a bonding material having at least 50 wt% Al₂O₃, wherein the abrasive particles have an average size of less than 10 micron and wherein at least three of the largest abrasive particles are greater than 20 micron

5. Claim : 100

a method for making agglomerate abrasive grains comprising at least 50 wt% Al₂O₃ and wherein at least three of the largest abrasive particles have the same volume, in which the dried precursor particles are impregnated with a composition comprising a liquid and at least a metal oxide.

6. Claims: 111,122

the common subject-matter of both process claims comprises a bonding material having at least 50 wt% Al₂O₃ and wherein at least three of the largest abrasive particles are greater than 20 micron

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

7. Claim : 137

a method for making agglomerate abrasive grains comprising
at least 50 wt% Al₂O₃ and wherein the abrasive grain has a
porosity value in the range of 10-60 %

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/42525

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