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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: MULTI-RESINOUS MOLDED ARTICLES HAVING DIFFUSED AND GRADED INTERFACES

Concentration of abrasive grit or other intensive property, depicted as color



TOP of ABRASIVE SEGMENT

BOTTOM of ABRASIVE SEGMENT

(57) Abstract: Molded articles in the form of grinding / cut-off wheels, drill bits, reamers, knife, blade, etc., having a core section or sections comprising a moldable resin of some intensive property, e.g., hardness, concentration, etc., and a surface layer or rim or section(s) comprising another moldable resin of different magnitude of the same intensive property e.g.; hardness, concentration, etc., and abrasive articles selected from one or more of diamond, cubic boron nitride (CBN), alumina, SiC, garnet, and mixtures thereof. The articles are characterized in that a) the resins comprising the sections are miscible and diffusively or convectively mixed; b) a composition ratio of the abrasive articles in the resins is decreased inwardly from a surface of said molded article on a scale of the mesh size of the abrasive and article size; and c) the resins comprising the sections are miscible and diffusively mixed.

WO 2004/065064 A3

# INTERNATIONAL SEARCH REPORT

Internat. Application No  
PCT/US2004/000254

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 B24D3/28 B24D5/12 B24D5/14

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 B23D B24D B24B

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.
E	US 2004/018809 A1 (FATHAUER PAUL ET AL) 29 January 2004 (2004-01-29) paragraph '0022!; figure 3b	1
X	EP 1 162 249 A (GEN ELECTRIC) 12 December 2001 (2001-12-12) paragraphs '0008!, '0011!, '0016!, '0018!	1-13
X	US 6 413 153 B1 (MOLAR CHARLES J) 2 July 2002 (2002-07-02) column 17, line 50 - line 53; figures 1-5 column 18, line 20 - line 24 column 20, line 42 - line 51 column 22, line 41 - line 45 column 23, line 60 - column 24, line 62  ----- -/--	1,6

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

26 January 2005

Date of mailing of the international search report

11 02. 2005

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## INTERNATIONAL SEARCH REPORT

 Intern  
 ernational Application No  
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 369 046 A (BRUSCHEK DIETER K ET AL) 18 January 1983 (1983-01-18)	1,13
A	column 1, line 42 - column 2, line 2; figure 1 column 2, line 36 - line 55 column 3, line 41 - line 56 column 4, line 16 - line 68; figures 3-5 -----	19
X	US 2 150 886 A (DER PYL EDWARD VAN) 14 March 1939 (1939-03-14) column 2, line 26 - column 3, line 30; figures 1,2 -----	1,13
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X	DE 10 22 113 B (WAGNER & ENGLERT G M B H) 2 January 1958 (1958-01-02) column 1, line 12 - line 17 column 1, line 52 - column 2, line 34; figures 1,2 -----	14
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X	US 2 404 192 A (RIES KERNELL G ET AL) 16 July 1946 (1946-07-16) column 3, line 54 - line 65; figure 1 -----	14
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X	US 4 910 924 A (BOUCHARD WILLIAM L ET AL) 27 March 1990 (1990-03-27) claims 1-5; figure 1 -----	14
X	GB 1 540 511 A (NORTON CO) 14 February 1979 (1979-02-14) claims 1-5; figure 1 -----	14
X	GB 429 415 A (NORTON COMPANY) 29 May 1935 (1935-05-29) page 1, line 40 - line 69; claim 3 -----	14,15,17
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# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US2004/000254

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 4 131 436 A (WIAND RONALD C) 26 December 1978 (1978-12-26) column 3, line 17 - line 41; figure 2; examples 1-3 -----	14

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2004/000254

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 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 III Observations where unity of invention is lacking (Continuation of item 3 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: 1-13,19

Abrasive tool with a diffused interface between two parts

1.1. claims: 1+2,3

Abrasive article with two parts comprising the same resin

1.2. claims: 1+4,5,8-12

Abrasive article with two parts containing both abrasive particles.

1.3. claims: 1+3,19

Abrasive tool machined in specific forms  
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2. claims: 14-18

Abrasive tool comprising abrasive particles with different mesh sizes  
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## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/000254

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