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**Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

[Continued on next page]

(54) Title: COATED ABRASIVE ARTICLE

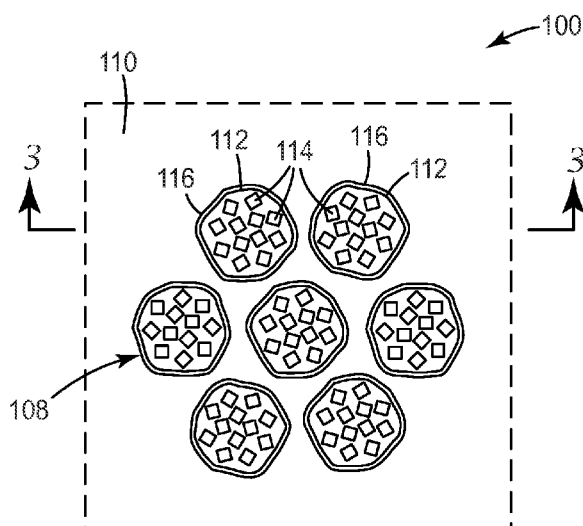


FIG. 26

(57) Abstract: Provided are abrasive articles (100) in which the make layer (112), abrasive particle layer (114), and size layer (116) are coated onto a backing (102) according to a coating pattern characterized by a pattern of discrete islands (108), or features (108), having an areal density ranging from about 30 features to about 300 features per square centimeter and an average feature diameter ranging from about 0.1 millimeters to about 1.5 millimeters. Optionally, the provided abrasive particles (114) have an average abrasive particle size ranging from about 20 micrometers to about 250 micrometers and the average make layer thickness ranging from 33 percent to 100 percent of the average abrasive particle size. This coating pattern provides that all three components are generally in registration with each other, while also providing a pervasive uncoated area extending across the backing (102), thereby providing improved cut and finish performance while displaying a resistance to curl in wet environments.

**Published:****(88) Date of publication of the international search report:**

27 February 2014

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

## INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/047742

A. CLASSIFICATION OF SUBJECT MATTER  
 INV. B24D11/00 B24D3/28  
 ADD.

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)  
 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 practicable, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No. |
|-----------|--|-----------------------|
| X         | WO 2012/003116 A1 (3M INNOVATIVE PROPERTIES CO [US]; EILERS DEBORAH J [US]; JANSSEN JEFFR) 5 January 2012 (2012-01-05)<br>cited in the application<br>the whole document | 1,4,<br>10-17         |
| X         | US 2005/245179 A1 (LUEDEKE ARTHUR P [US])<br>3 November 2005 (2005-11-03)<br>figure 4<br>paragraphs [0001], [0012], [0026],<br>[0027], [0037], [0038]                    | 1,4,<br>10-17         |
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Further documents are listed in the continuation of Box C.



See patent family 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 application or patent 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

"&" document member of the same patent family

Date of the actual completion of the international search

22 August 2013

Date of mailing of the international search report

08/01/2014

Name and mailing address of the ISA/

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Endres, Mirja

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2013/047742

## Box No. 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 No. 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 fees, this Authority did not invite payment of additional fees.
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.:

1, 4, 10-17

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ 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, 4, 10-17

Abrasive article with a multiplicity of features having an areal density ranging from about 30 features to about 300 features per cm<sup>2</sup> and an average feature diameter ranging from about 0.1 mm to about 1.5 mm.

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2. claims: 2, 3, 5-9

Abrasive article with a thickness of the make layer selected as a function of the abrasive particle size

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## INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/047742

| C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT |  |                       |
|--|--|-----------------------|
| Category*  | Citation of document, with indication, where appropriate, of the relevant passages                         | Relevant to claim No. |
| A  | EP 0 546 732 A1 (MINNESOTA MINING & MFG<br>[US]) 16 June 1993 (1993-06-16)<br>abstract; figure 2a<br>----- | 1,4,<br>10-17         |

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2013/047742

| Patent document<br>cited in search report |    | Publication<br>date |    | Patent family<br>member(s) |  | Publication<br>date |
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