

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
2 December 2004 (02.12.2004)

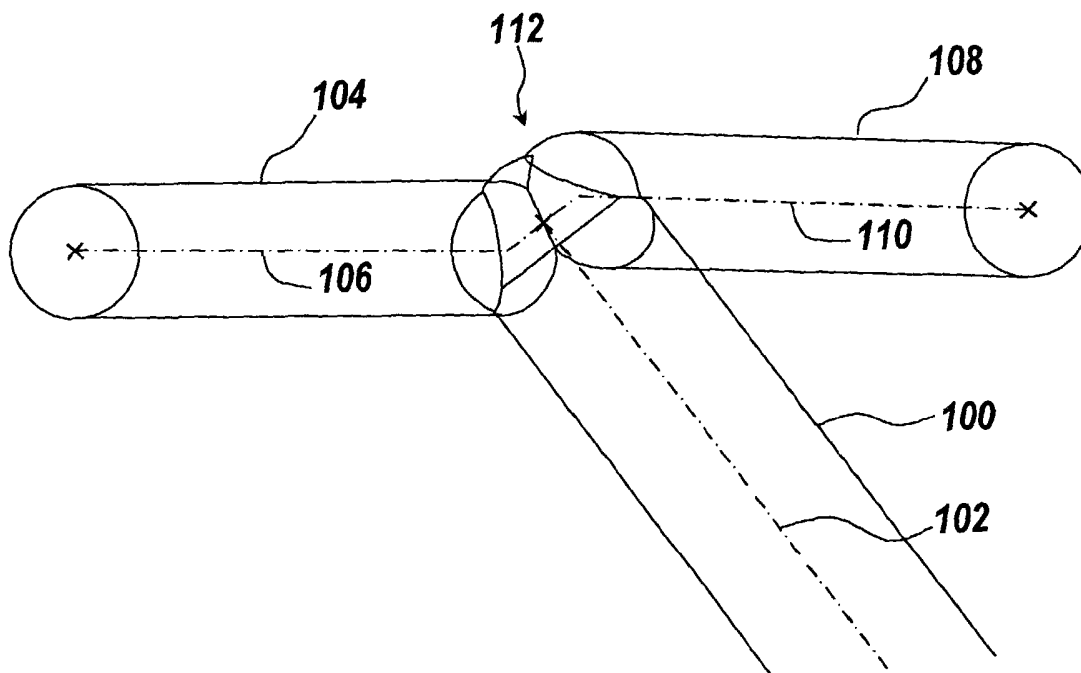
PCT

(10) International Publication Number  
**WO 2004/103670 A3**

- (51) International Patent Classification<sup>7</sup>: **B29C 45/22** (74) Agents: LAURENTANO, Anthony, A. et al.; Lahive & Cockfield, LLP, 28 State Street, Boston, MA 02109 (US).
- (21) International Application Number:  
PCT/US2004/016182 (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (22) International Filing Date: 20 May 2004 (20.05.2004) (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
60/472,179 20 May 2003 (20.05.2003) US
- (71) Applicant (for all designated States except US): KO-RTEC, INC. [US/US]; Cummings Center #128Q, Beverly, MA 01915 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): SABIN, Doug [US/US]; 52 Rockaway Avenue, Marblehead, MA 01945 (US). SWENSON, Paul [US/US]; 109 Blueberry Lane, So. Hamilton, MA 01982 (US).

[Continued on next page]

(54) Title: APPARATUS AND METHOD FOR FLUID DISTRIBUTION



(57) Abstract: A method and apparatus for evenly distributing a fluid that exhibits shear heating is disclosed. The method and apparatus provide an intersection geometry for an intersection (24) of a bore (100) and sub-bore (104). The intersection geometry controls distribution of a flow asymmetry (112) of a working material to facilitate the division of shear heated material (72) into substantially equal portions at subsequent downstream locations. At least one method is disclosed for forming the flow bore intersections of the present invention.



**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

*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.*

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

23 June 2005

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/16182

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B29C 45/22

US CL : 425/570,572; 264/328.8

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)

U.S. : 425/570,572,573; 264/328.8,328.12

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)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4,810,184 A (Gellert et al) 07 March 1989 (07.03.1989)	
A	US 6,454,558 A (Gellert) 24 September 2002 (24.09.02)	
A	US 6,752,618 A (DEWAR et al) 22 June 2004 (22.06.2004)	



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 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

20 April 2005 (20.04.2005)

Date of mailing of the international search report

13 MAY 2005

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Tim Heitbrink

Telephone No. 571-272-0987

*J. White*  
*For*