

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
25 March 2004 (25.03.2004)

PCT

(10) International Publication Number
WO 2004/024421 A1

(51) International Patent Classification⁷: **B29C 59/00**,
B23B 5/00, 29/26

(21) International Application Number:
PCT/US2003/020785

(22) International Filing Date: 2 July 2003 (02.07.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/241,247 10 September 2002 (10.09.2002) US

(71) Applicant: **3M INNOVATIVE PROPERTIES COMPANY** [US/US]; 3M Center, Post Office Box 33427, Saint Paul, MN 55133-3427 (US).

(72) Inventors: **BRYAN, William, J.**; Post Office Box 33427, Saint Paul, MN 55133-3427 (US). **SEWALL, Nelson, D.**;

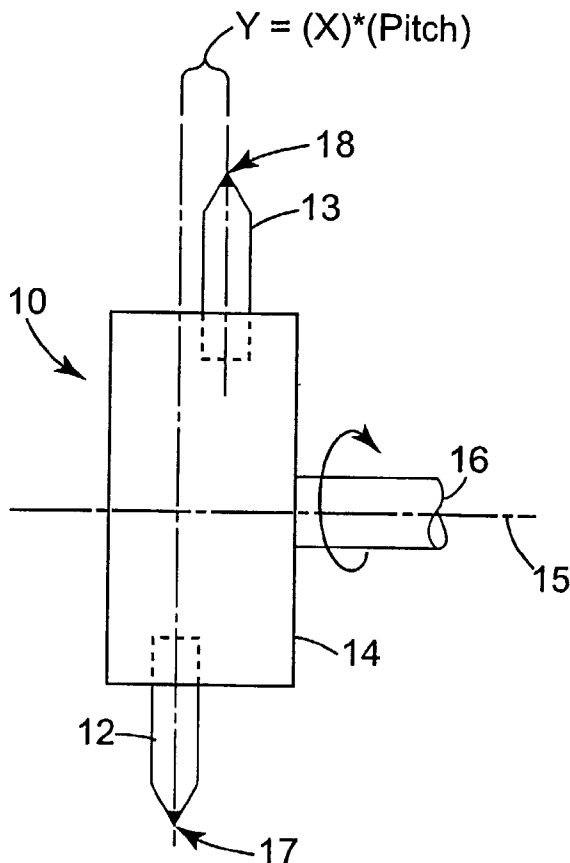
Post Office Box 33427, Saint Paul, MN 55133-3427 (US). **CLEMENTS, Jeffrey, E.**; Post Office Box 33427, Saint Paul, MN 55133-3427 (US). **SCHRANK, Greg, E.**; Post Office Box 33427, Saint Paul, MN 55133-3427 (US).

(74) Agents: **BUCKINGHAM, Stephen, W.** et al.; Office of Intellectual Property Counsel, Post Office Box 33427, Saint Paul, MN 55133-3427 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT (utility model), AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (utility model), DE, DK (utility model), DK, DM, DZ, EC, EE (utility model), EE, ES, FI (utility model), 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, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK (utility model), SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: MULTI-DIAMOND CUTTING TOOL ASSEMBLY FOR CREATING MICROREPLICATION TOOLS



(57) Abstract: In one embodiment, a cutting tool assembly (10) used for creating grooves in a microreplication tool (72a) is described. The cutting tool assembly includes a mounting structure (10) and multiple diamonds (12, 13) mounted in the mounting structure (14). For example, first and second tool shanks having first (17) and second diamond tips can be positioned in the mounting structure (14) such that a cutting location of a diamond cutting tip of the first tool shank is a defined distance from a cutting location of a diamond cutting tip of the second tool shank. The defined distance (y) may correspond to an integer number (x) of pitch spacings, and may be accurate to within a tolerance of less than 10 microns.

WO 2004/024421 A1



(84) **Designated States (regional):** ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

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.

Declarations under Rule 4.17:

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