

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
7 September 2007 (07.09.2007)

PCT

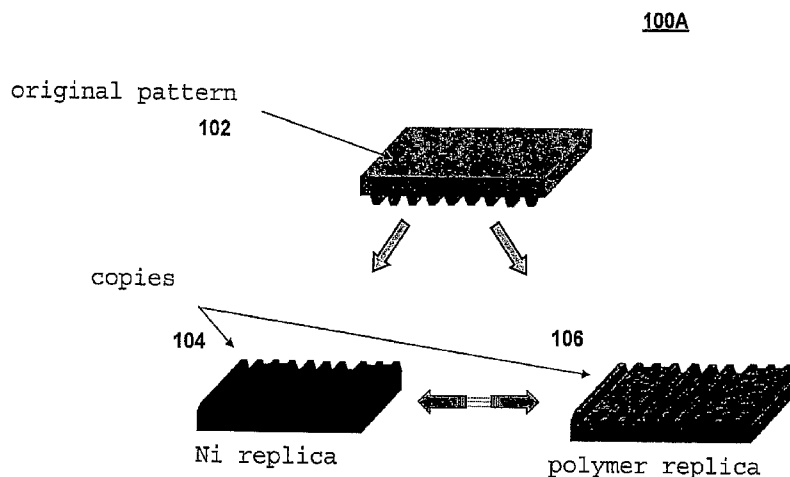
(10) International Publication Number
WO 2007/100849 A3

- (51) International Patent Classification:
B29D 11/00 (2006.01)
- (21) International Application Number:
PCT/US2007/005151
- (22) International Filing Date:
27 February 2007 (27.02.2007)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/777,203 27 February 2006 (27.02.2006) US
60/777,138 27 February 2006 (27.02.2006) US
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- (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, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (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, IS, IT, LT, LU, LV, 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).

- 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
- (88) Date of publication of the international search report:
10 April 2008

(54) Title: FORMATION OF PATTERN REPLICATING TOOLS



(57) Abstract: Systems, methods, and apparatus are disclosed for making patterning tools from one or more discrete elements. Such tools can have one or more "seams" or joints where the individual elements abut which can limit the tools' performance and utility in roll-to-roll manufacturing. Methods are described herein for producing "near-seamless" tools, that is, tools having seams that exhibit minimum disruption of the tool pattern and thus improved material produced by such tools. The patterning tools can be cylindrical and/or closed in shape.

WO 2007/100849 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/05151

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - B29D 11/00 (2007.10)

USPC - 264/1.6

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(8) -B29D 11/00 (2007.10)

USPC - 264/1.6; 425/357, 365

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)

PatBase

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 4,478,769 A (PRICONE et al.) 23 October 1984 (23.10.1984) entire document	1-15,17-20,22,31-33, 37-42,46,50-56 ----- 16,21,23-30,34-36,43-45, 47-49,72-76
X --- Y	US 5,358,283 A (SILVA) 25 October 1994 (25.10.1994) entire document	57 ----- 58-64
X --- Y	US 2004/0131718 A1 (CHOU et al.) 08 July 2004 (08.07.2004) entire document	65-71,82-83,86-101 ----- 72-81,84-85
Y	US 6,875,384 B1 (WHITNEY) 05 April 2005 (05.04.2005) entire document	16,34-36,43-45,58-63
Y	US 2005/0239935 A1 (KANG et al.) 27 October 2005 (27.10.2005) entire document	21
Y	US 2004/0175528 A1 (PAULSON et al.) 09 September 2004 (09.09.2004) entire document	23-30,47-48
Y	US 2002/0186472 A1 (SLOOT) 12 December 2002 (12.12.2002) entire document	49
Y	US 6,015,599 A (KELLER et al.) 18 January 2000 (18.01.2000) entire document	64
Y	US 6,551,410 B2 (CREVASSE et al.) 22 April 2003 (22.04.2003) entire document	75-81
Y	EP 1,093,901 A1 (CHANG) 25 April 2001 (25.04.2001) entire document	84-85

Further documents are listed in the continuation of Box C.

* 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

17 December 2007

Date of mailing of the international search report

01 FEB 2008

Name and mailing address of the ISA/US

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P.O. Box 1450, Alexandria, Virginia 22313-1450

Facsimile No. 571-273-3201

Authorized officer:

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PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/05151

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 Extra 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 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.:

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.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/05151

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-8 are drawn to a relief pattern replication tool.

Group II, claims 9-56 are drawn to a method of forming a replica pattern.

Group III, claims 57-101 are drawn to a cylindrical shell.

The inventions listed as Groups I-III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical features of Group I, two or more discrete elements having relief patterns and arranged with one or more common seams between the elements, wherein corresponding relief patterns on adjacent elements are aligned across a common seam, are not present in Groups II or III; the special technical features of Group II, forming a first relief pattern on a selected surface of a support cylinder; forming a first layer on the selected surface; and separating the first layer from the support cylinder, forming a cylindrical sleeve including a second relief pattern, are not present in Groups I or III; the special technical features of Group III, a multi-segment shell including multiple segment, wherein each segment is configured and arranged for adjustment along a cylinder axis; and a precision dovetail slide configured and arranged between two of the multiple segments, are not present in Groups I or II.

Since none of the special technical features of the Group I-III inventions is found in more than one of the inventions, unity is lacking.