

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
20 October 2005 (20.10.2005)

PCT

(10) International Publication Number
WO 2005/097439 A3

(51) International Patent Classification⁷: **B26F 1/28**

(21) International Application Number:
PCT/EP2005/003319

(22) International Filing Date: 30 March 2005 (30.03.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2004/000206 1 April 2004 (01.04.2004) CH
2004/000279 7 May 2004 (07.05.2004) CH

(71) Applicant and

(72) Inventor: SCHMIDT, Christian [DE/CH]; Place de la Croix-Blanche 7, CH-1066 Epalinges (CH).

(74) Agents: ENGELHARD, Markus et al.; Boehmert & Boehmert, Hollerallee 32, 28209 Bremen (DE).

(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, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, 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, 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).

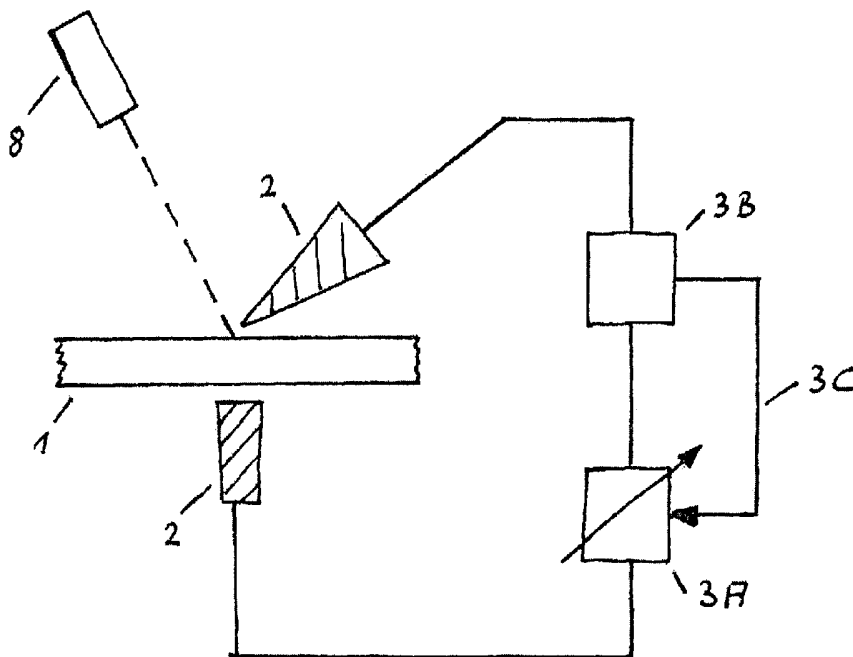
Published:

— with international search report

(88) Date of publication of the international search report:
2 March 2006

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: MANUFACTURING AND USE OF MICROPERFORATED SUBSTRATES



(57) Abstract: This invention relates to methods and devices for the production of micro-structured substrates and their application in natural sciences and technology, in particular in analysis and detection systems based on artificial and biological lipid membranes. The structure is preferably a hole or a cavity or channel and is obtained by spark perforation. Energy, preferably heat, is applied to the region to be structured so as to reduce the amplitude of voltage required and/or soften the material. The electrical parameters of the spark perforation are feedback-controlled.



WO 2005/097439 A3

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2005/003319

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B26F1/28

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 B81B B26F

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
A	US 4 777 338 A (CROSS ET AL) 11 October 1988 (1988-10-11) column 3, line 38 - column 3, line 49; figures	1-67
A	US 6 348 675 B1 (TAKAGI KAZUNARI) 19 February 2002 (2002-02-19)	1-67
X	the whole document	51
A	GB 1 089 369 A (MEYER LABORATORIES., INC) 1 November 1967 (1967-11-01) page 5, line 118 - page 5, line 124 page 10, line 38 - page 10, line 55	1-67
	-/--	

☒ 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.

"&" document member of the same patent family

Date of the actual completion of the international search

17 June 2005

Date of mailing of the international search report

17. 10. 2005

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Canelas, R.F.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2005/003319

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	"ELEKTROSTATISCHE MIKROPEFFORATION: ENERGIEENSPARUNG UND LEISTUNGSVERBESSERUNG" PAPIER + KUNSTSTOFF VERARBEITER, DEUTSCHE FACHVERLAG. FRANKFURT, DE, vol. 33, no. 3, March 1998 (1998-03), page 46, XP000741768 ISSN: 0048-2897 -----	1-67
A	GB 1 096 269 A (INSTITUT DE RECHERCHES DE LA SIDERURGIE FRANCAISE) 20 December 1967 (1967-12-20) page 2, line 21 - line 73; figures -----	1-67
A	GB 1 165 458 A (POLYPLASTE, H.ROLF SPRANGER K.G.) 1 October 1969 (1969-10-01) the whole document -----	1-67
A	WO 99/31503 A (VOGEL, HORST; SCHMIDT, CHRISTIAN) 24 June 1999 (1999-06-24) cited in the application abstract -----	1-67

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2005/003319

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.:

1-67

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: 1-67

Methods and devices for spark perforating an electrically insulating substrate, solving manufacturing problems.

2. claims: 68-73

Electrically insulating substrates having a structure or array of structures as produced by spark perforation and use of the same. These solve several application problems.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP2005/003319

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4777338	A	11-10-1988	NONE
US 6348675	B1	19-02-2002	AU 755497 B2 12-12-2002
		AU 8638698 A	01-03-1999
		CA 2301668 A1	18-02-1999
		CN 1207340 A	10-02-1999
		DE 69804806 D1	16-05-2002
		DE 69804806 T2	14-11-2002
		EP 1001869 A1	24-05-2000
		WO 9907530 A1	18-02-1999
		JP 11048198 A	23-02-1999
GB 1089369	A	01-11-1967	NONE
GB 1096269	A	20-12-1967	AT 266488 B 25-11-1968
		BE 666899 A	03-11-1965
		DE 1300994 B	14-08-1969
		FR 1418083 A	19-11-1965
GB 1165458	A	01-10-1969	NONE
WO 9931503	A	24-06-1999	AT 205300 T 15-09-2001
		AU 746580 B2	02-05-2002
		AU 8237998 A	05-07-1999
		CA 2316966 A1	24-06-1999
		DE 59801410 D1	11-10-2001
		DK 1040349 T3	28-01-2002
		EP 1040349 A1	04-10-2000
		ES 2163284 T3	16-01-2002
		HK 1028450 A1	15-03-2002
		JP 3486171 B2	13-01-2004
		JP 2002508516 T	19-03-2002
		US 6758961 B1	06-07-2004