



(51) International Patent Classification:
B29C 67/00 (2006.01)

(21) International Application Number:
PCT/US2012/043823

(22) International Filing Date:
22 June 2012 (22.06.2012)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/500,064 22 June 2011 (22.06.2011) US

(71) Applicant (for all designated States except US): **DSM IP ASSETS BV** [NL/NL]; Het Overloon 1, NL-6411 TE Heerlen (NL).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **BAUMAN, Brian** [US/US]; 246 Mustang Mesa, Liberty Hill, Texas 78642 (US). **THOMAS, Richard** [US/US]; 1208 Jill Peak Drive, Sleepy Hollow, Illinois 60118 (US).

(74) Agent: **DiSANTO, Louis**; Banner & Witcoff, LTD., 10 South Wacker Drive, Suite 3000, Chicago, Illinois 60606-7407 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO,

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, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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))

Published:

- with international search report (Art. 21(3))

(88) Date of publication of the international search report:
25 April 2013

(54) Title: AN APPARATUS AND METHOD FOR THE SEPARATION OF A FOIL FROM A MATERIAL LAYER

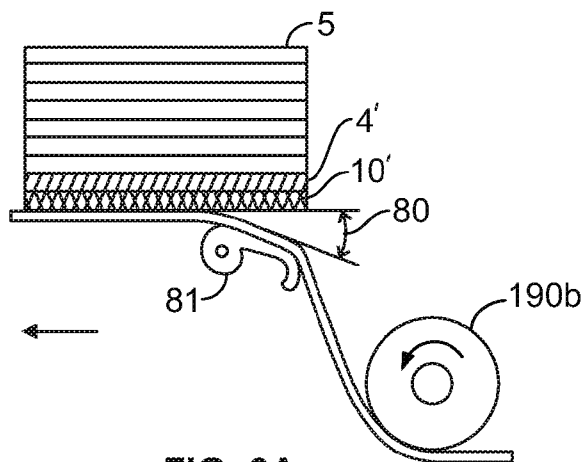


FIG. 6A

(57) Abstract: An apparatus and method for additive fabrication which helps to prevent the newly hardened layer from being separated from the previously formed layer of the object while the foil is peeled from the newly hardened layer is provided. In one embodiment, use of a peel angle helps prevent the newly hardened layer from being separated from the previously formed layer during peeling by distributing the peeling force so that less of the z-direction component of the peeling force is applied to the newly hardened layer. In another embodiment, the object can be oriented to initiate the peel at an area, of the object which results in a lesser initial peeling force applied to the newly hardened layer.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/043823

A. CLASSIFICATION OF SUBJECT MATTER
INV. B29C67/00
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)
B29C

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)

EP0-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	EP 2 199 067 A1 (TNO [NL]) 23 June 2010 (2010-06-23) paragraph [0006] - paragraph [0008] paragraph [0011] paragraph [0033] - paragraph [0037] paragraph [0045] - paragraph [0047] figure 4	1-24,31
X	----- EP 1 253 002 A1 (ENVISION TECHNOLOGIES GMBH [DE]) 30 October 2002 (2002-10-30) paragraph [0001] paragraph [0004] - paragraph [0007] paragraph [0010] - paragraph [0014] pages 3b,3c	1-24,31
X	----- US 2011/089610 A1 (EL-SIBLANI ALI [US] ET AL) 21 April 2011 (2011-04-21) the whole document ----- -/--	1-24,31



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

21 September 2012

Date of mailing of the international search report

06/02/2013

Name and mailing address of the ISA/

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

Authorized officer

Whelan, Natalie

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/043823

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 732 746 A1 (ENVISIONTEC GMBH [DE]) 20 December 2006 (2006-12-20) paragraph [0001] paragraph [0012] - paragraph [0013] paragraph [0018] - paragraph [0031] figures 7,11-13 -----	1-24,31
X	EP 2 011 631 A1 (ENVISIONTEC GMBH [DE]) 7 January 2009 (2009-01-07) claims figures 1,5b -----	1-24,31
X	US 5 192 559 A (HULL CHARLES W [US] ET AL) 9 March 1993 (1993-03-09) figure 3 column 3, line 35 - line 55 column 13, line 6 - column 15, line 45 -----	6,31

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2012/043823

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2199067	A1	23-06-2010	NONE
EP 1253002	A1	30-10-2002	AT 378166 T 15-11-2007 DE 10119817 A1 24-10-2002 EP 1253002 A1 30-10-2002 EP 1439051 A2 21-07-2004 EP 1439052 A2 21-07-2004 EP 2269809 A1 05-01-2011 IL 149054 A 05-07-2006 JP 4438979 B2 24-03-2010 JP 2002370286 A 24-12-2002 JP 2008137392 A 19-06-2008 US 2002153640 A1 24-10-2002 US 2007063389 A1 22-03-2007
US 2011089610	A1	21-04-2011	US 2011089610 A1 21-04-2011 WO 2012054099 A1 26-04-2012
EP 1732746	A1	20-12-2006	EP 1732746 A1 20-12-2006 JP 2007536130 A 13-12-2007 WO 2005110721 A1 24-11-2005
EP 2011631	A1	07-01-2009	AT 553910 T 15-05-2012 CN 101918198 A 15-12-2010 DK 2011631 T3 25-06-2012 EP 2011631 A1 07-01-2009 EP 2173538 A2 14-04-2010 JP 2011504819 A 17-02-2011 US 2009020901 A1 22-01-2009 WO 2009003696 A2 08-01-2009
US 5192559	A	09-03-1993	US 5192559 A 09-03-1993 US 5637169 A 10-06-1997

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/043823

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.:

1-24(completely); 31(partially)

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: 1-24(completely); 31(partially)

method and device to allow adaptation of distribution of the pulling forces for the foil peeling step.

2. claims: 25-30(completely); 31(partially)

method and device allowing adjusting separation time of newly hardened layer from foil
