

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
8 November 2007 (08.11.2007)

PCT

(10) International Publication Number
WO 2007/127111 A3

(51) International Patent Classification:
B32B 41/00 (2006.01)

(21) International Application Number:
PCT/US2007/009423

(22) International Filing Date: 18 April 2007 (18.04.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/793,976 21 April 2006 (21.04.2006) US
11/417,445 3 May 2006 (03.05.2006) US

(71) Applicant (for all designated States except US): **CORNING INCORPORATED** [US/US]; 1 Riverfront Plaza, Corning, New York 14831 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **CADY, Raymond, C.** [US/US]; 111 Talarico Road, Horseheads, New York 14845 (US). **COSTELLO III, John, J.** [US/US]; 3947 Kindred Way, Lake Elmo, MN 55042 (US). **LAKOTA,**

Alexander [US/US]; 7710 N. Main Street, Kanona, New York 14856 (US). **LOCK, William, E.** [US/US]; 183 Wygant Road, Horseheads, New York 14845 (US). **THOMAS, John, C.** [US/US]; 77 Hendy Creek Road, Elmira, New York 14905 (US).

(74) Agent: **SCHAEBERLE, Timothy, M.**; Corning Incorporated, SP-TI-3-1, Corning, New York 14831 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, 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, 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.

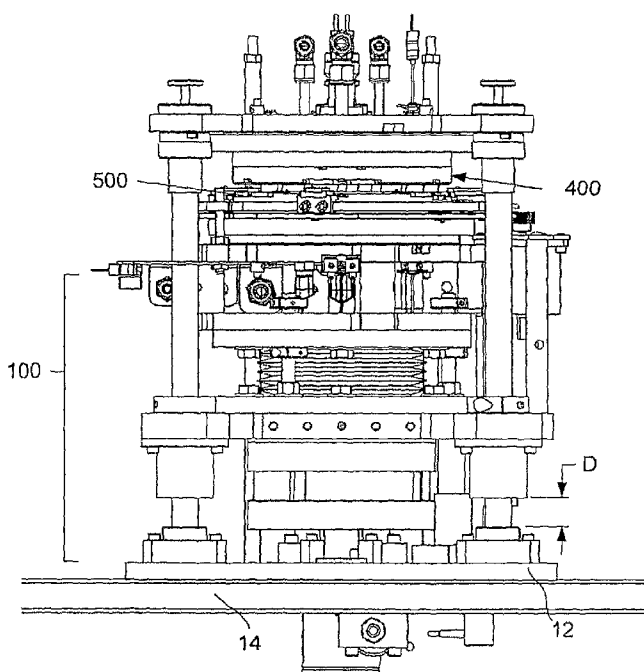
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,

[Continued on next page]

(54) Title: HIGH TEMPERATURE ANODIC BONDING APPARATUS

FIG. 4A

10



(57) Abstract: An anodic bonding apparatus includes: a first bonding plate mechanism operable to engage a first material sheet, and to provide at least one of controlled heating, voltage, and cooling thereto; a second bonding plate mechanism operable to engage a second material sheet, and to provide at least one of controlled heating, voltage, and cooling thereto; a pressure mechanism operatively coupled to the first and second bonding plate mechanisms and operable to urge the first and second bonding plate mechanisms toward one another to achieve controlled pressure of the first and second material sheets against one another along respective surfaces thereof; a control unit operable to produce control signals to the first and second bonding plate mechanisms and the pressure mechanism to provide heating, voltage, and pressure profiles sufficient to achieve anodic bonding between the first and second material sheets.



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, MT, 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).

— *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments*

Published:

— *with international search report*

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

11 December 2008

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/09423

A. CLASSIFICATION OF SUBJECT MATTER

IPC: **B32B 41/00**(2006.01)

USPC: 156/359

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. : 156/359

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.
X	US 6,168,678 B1 (PLANKENHORN et al) 2 January 2001 (02.01.2001), entire document, especially Figure 3 and columns 3-6.	1-11, 42

☐ 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

10 September 2008 (10.09.2008)

Date of mailing of the international search report

02 OCT 2008

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. (571) 273-3201

Authorized officer

George R. Koch III

Telephone No. (703) 308-0661

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/09423

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:
Please See Continuation 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 any 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.: 1-11 and 42

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/US07/09423

BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains claims directed to more than one species of the generic invention. These species are deemed to lack unity of invention because they are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In order for more than one species to be examined, the appropriate additional examination fees must be paid. The species are as follows:

Species I - an anodic bonding apparatus with a pressure mechanism and control unit (see claim 1, species covers claims 1-11 and 40).

Species II - an anodic bonding apparatus with a lift and press mechanism (see claim 12, covers claims 12-22).

Species III - an anodic bonding apparatus with an open and close mechanism (see claim 23, covers claims 23-30).

Species IV - an anodic bonding apparatus with a spacer mechanism (claim 31, covers claims 31-39).

The species listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the species lack the same or corresponding special technical features for the following reasons: Anodic bonding apparatus with plate mechanisms are known, as shown by US 6,168,678 to Plankenhorn. As the plate mechanisms are the only single inventive concept common to all claims, and are known in the prior art, and therefore is not a special technical feature, the species do not have corresponding special technical features.