

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
14 June 2001 (14.06.2001)

PCT

(10) International Publication Number  
**WO 01/41993 A3**

(51) International Patent Classification<sup>7</sup>: **B29C 70/44**

(21) International Application Number: PCT/US00/33163

(22) International Filing Date: 7 December 2000 (07.12.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/169,531 7 December 1999 (07.12.1999) US

(71) Applicant: **THE BOEING COMPANY** [US/US]; P.O. Box 3707, M/S 13-08, Seattle, WA 98124-2207 (US).

(72) Inventors: **WALDROP, John, C., III**; 8 Auburn Ridge Court, St. Peters, MO 63376 (US). **HARSHMAN, Bruce**; 1543 Prospect Lakes Drive, Wentzville, MO 63385 (US). **BURKETT, William, R.**; 6718 Dale Avenue, St. Louis, MO 63139 (US). **TEGELER, Alan, F.**; 313 Bristol Place, O'Fallon, MO 63366 (US). **SESTI, Carmine, J.**; 409 Morning Side, St. Peters, MO 63376 (US). **WEINMAN, Wes, P.**; 1901 Straube Lane, Brighton, IL 62012 (US).

(74) Agent: **HAMMAR, John, C.**; The Boeing Company, M/S 13-08, P.O. Box 3707, Seattle, WA 98124-2207 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, 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, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

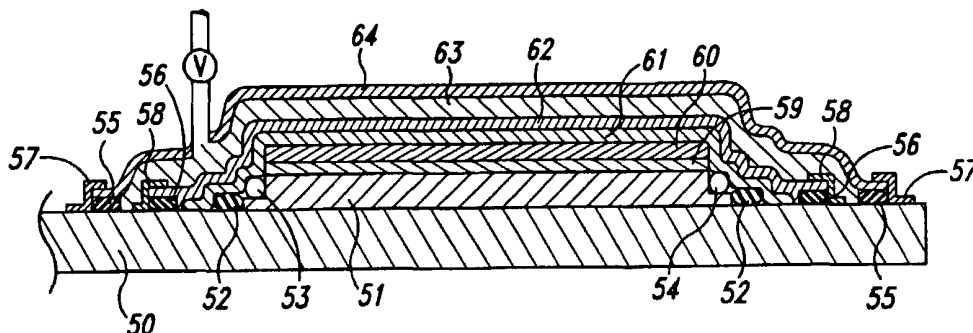
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML,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

Published:  
— with international search report

(88) Date of publication of the international search report:  
10 January 2002

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: DOUBLE BAG VACUUM INFUSION PROCESS AND SYSTEM FOR LOW COST, ADVANCED COMPOSITE FABRICATION



(57) Abstract: The double bag vacuum infusion process of the present invention provides a low cost, method for producing complex composite assemblies without an autoclave. It also enables the production of highly innovative structures. The quality of the composites produced using such an infusion process are comparable to composites made using prepregs, hand layup or fiber placement, and autoclave curing.



WO 01/41993 A3

# INTERNATIONAL SEARCH REPORT

International Application No

PC1/US 00/33163

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 B29C70/44

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 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 practical, search terms used)

EPO-Internal, WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X A	EP 1 038 656 A (LS TECHNOLOGIES INC) 27 September 2000 (2000-09-27) column 6, line 1 -column 11, line 14; figures -----	2-4
X A	US 4 942 013 A (PALMER RAYMOND J ET AL) 17 July 1990 (1990-07-17) the whole document ---	2,3,10 1,5-9
X	SIEGBERG, R. ET AL: "Eine fortschrittliche GFK-Fertigungstechnik setzt sich durch: Praxiserfahrungen mit dem Vakuum-Injektions-Verfahren" STUDIEDAG VAKUUMINJECTEREN, 27 - 27 October 1988, XP002169062 Delft page 15; figure 11 -----	10

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  <p style="text-align: center; font-weight: bold;">7 June 2001</p>	Date of mailing of the international search report  <p style="text-align: center; font-weight: bold;">09/07/2001</p>
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  <p style="text-align: center; font-weight: bold;">Van Wallene, A</p>

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PC1/US 00/33163

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1038656 A	27-09-2000	NONE	
US 4942013 A	17-07-1990	NONE	