



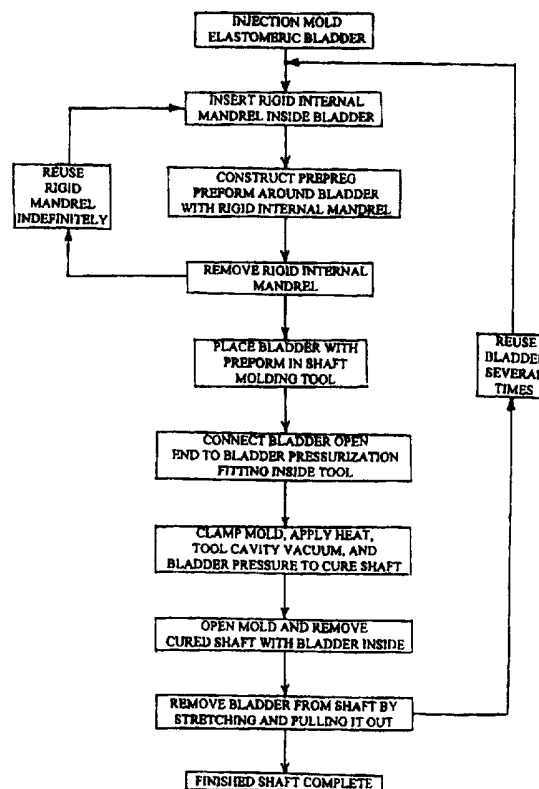
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/US97/05711 (22) International Filing Date: 8 April 1997 (08.04.97) (30) Priority Data: 08/629,525 9 April 1996 (09.04.96) US (71) Applicant: RADIUS ENGINEERING, INC. [US/US]; 3474 South 2300 East, Salt Lake City, UT 84109 (US). (72) Inventors: NELSON, Ronald, H.; 4210 South Monarch Way, Salt Lake City, UT 84124 (US). MILOVICH, Dimitrije; 475 8th Avenue, Salt Lake City, UT 84103 (US). (74) Agent: SONNTAG, James, L.; Law Office of James L. Sonntag, P.O. Box 540613, North Salt Lake, UT 84054-0613 (US).</p>		<p>(81) Designated States: AU, JP, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 4 December 1997 (04.12.97)</p>

(54) Title: METHOD FOR MANUFACTURING COMPOSITE SHAFTS

(57) Abstract

The invention pertains to a method for manufacturing a composite shaft. The method includes the steps of: providing an impregnated fibrous material (280); wrapping the impregnated fibrous material (280) around a shaped pressurizable bladder (260); placing the assembly of the bladder (260) and the fibrous material (280) into the female tooling (204); pressurizing the bladder (260), thereby pressing the fibrous material (280) against the tooling (204); heating the tooling (204), thereby forming the fibrous material (280) into a hardened composite while maintaining pressure in the bladder (260); releasing the pressure in the bladder (260); and removing the bladder (260) from the interior of the hardened composite.



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US97/05711

A. CLASSIFICATION OF SUBJECT MATTER
IPC(6) :B27N 3/10
US CL :264/314
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. : 264/314

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.
Y	FR 2,670,120 A (BANCHELIN ET AL) 06 DECEMBER 1992, SEE ENTIRE DOCUMENT	1-19
Y	US 4,808,362 A (FREEMAN) 28 FEBRUARY 1989, SEE ENTIRE DOCUMENT	1-19
Y	US 4,124,678 A (STROUPE) 07 NOVEMBER 1978, SEE ENTIRE DOCUMENT	1-19
X	US 4,759,893 A (KRAUTER) 26 JULY 1988, SEE ENTIRE DOCUMENT	1
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Y		2-19
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US97/05711

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X -- Y	US 5,106,440 A (TANGEMAN) 21 APRIL 1992, SEE ENTIRE DOCUMENT	1 ----- 2-19
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X -- Y	US 5,314,653 A (HARALAMBOPOULOS) 24 MAY 1994, SEE ENTIRE DOCUMENT	1 ----- 2-19
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