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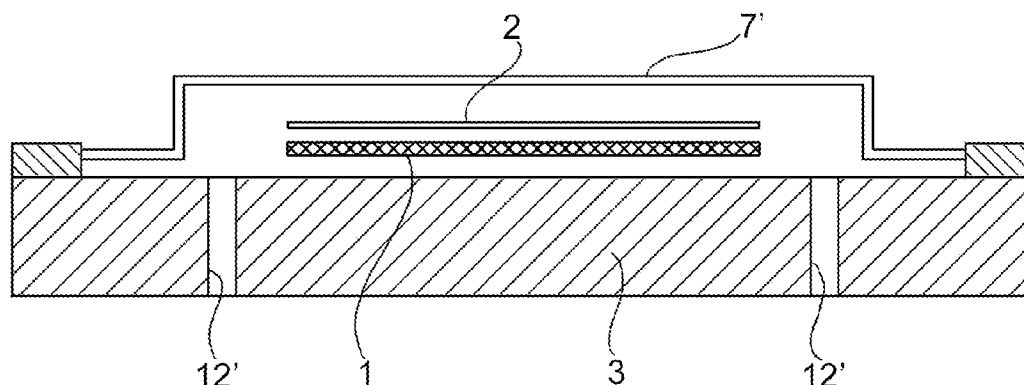
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- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- of inventorship (Rule 4.17(iv))

[Continued on next page]

(54) Title: A METHOD OF MANUFACTURING A CURVED ELEMENT MADE OF COMPOSITE MATERIAL

FIG.3



(57) Abstract: A method of manufacturing a curved element made of composite material comprises the following steps: a) preparing at least one dry, flat reinforcing layer (1) with curved fibres, b) combining a resin film (2) with the dry, flat reinforcing layer, and applying heat and pressure in controlled manner so as to bring about the infusion of the resin into the reinforcing layer and to obtain at least one layer of pre-infused material (Y), c) preparing at least one prepreg layer (31, 32) with straight fibres impregnated with resin compatible with the resin of the pre-infused material, d) superimposing the layer of pre-infused material and the prepreg layer on one another so as to obtain a layered structure (1''), and e) subjecting the layered structure, arranged on a shaped support tool (30), to a polymerization cycle so as to obtain the curved element.

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B29C B29B

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)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2006/119002 A (BOEING CO [US]; BROWN TODD A [US]; FRIDDELL STEPHEN DOUGLAS [US]; HARR) 9 November 2006 (2006-11-09) page 5, lines 5-23; claims 1-3,10-12,15,19,23,6; figures 1a,3,5,6,9 page 8, lines 3-16 page 10, lines 4-11 page 16, line 22 - page 17, line 18	1-9
A	US 2003/104156 A1 (OSADA TAMOTSU [JP] ET AL) 5 June 2003 (2003-06-05) paragraphs [0029], [0035], [0038] - [0040]; claims 1,5; figures 2a,2b,3	1-9
A	EP 1 584 462 A (ALENIA AERONAUTICA S P A [IT]) 12 October 2005 (2005-10-12) claim 1; figures 2,4	1-9
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 02 196609 A (FUJI HEAVY IND LTD) 3 August 1990 (1990-08-03) abstract; figures 1-3 -----	1,9
A	EP 1 541 312 A (MITSUBISHI RAYON CO [JP]) 15 June 2005 (2005-06-15) paragraphs [0093], [0094], [0119], [0140], [0159], [0161], [0167]; claims 15,16,29,33; figures 3,4 -----	1-9
A	EP 1 775 106 A (SAAB AB [SE]) 18 April 2007 (2007-04-18) paragraphs [0017], [0018]; claims 1-4,9; figure 1a -----	1,9

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2008/052968

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 2006119002	A	09-11-2006	EP 1899146 A2 JP 2008540168 T US 2006249868 A1	19-03-2008 20-11-2008 09-11-2006
US 2003104156	A1	05-06-2003	JP 3911410 B2 JP 2003165182 A	09-05-2007 10-06-2003
EP 1584462	A	12-10-2005	US 2005268832 A1	08-12-2005
JP 2196609	A	03-08-1990	NONE	
EP 1541312	A	15-06-2005	CN 1668433 A WO 2004009314 A1 US 2006035548 A1	14-09-2005 29-01-2004 16-02-2006
EP 1775106	A	18-04-2007	US 2008048359 A1	28-02-2008