

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
12 February 2004 (12.02.2004)

PCT

(10) International Publication Number
WO 2004/013236 A3

- (51) International Patent Classification⁷: **B29C 41/02**
- (21) International Application Number:
PCT/US2003/022677
- (22) International Filing Date: 21 July 2003 (21.07.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/400,324 1 August 2002 (01.08.2002) US
60/400,095 1 August 2002 (01.08.2002) US
60/402,459 9 August 2002 (09.08.2002) US
60/402,784 12 August 2002 (12.08.2002) US
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, 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, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant: **GENERAL MOTORS CORPORATION**
[US/US]; 300 Renaissance Center, MC 482-C23-B21, P.O. Box 300, Detroit, MI 48265-3000 (US).

(72) Inventors: **KIA, Sheila, F.**; 1948 Sherwood Glenn, Bloomfield Hills, MI 48302 (US). **RAI, Devi, N.**; 2848 River Tr., Rochester Hills, MI 48309 (US). **KIA, Hamid, G.**; 1948 Sherwood Glen, Bloomfield Hills, MI 48302 (US).

(74) Agents: **DESCHERE, Linda, M.** et al.; Harness, Dickey & Pierce, P.L.C., P.O. Box 828, Bloomfield Hills, MI 48303 (US).

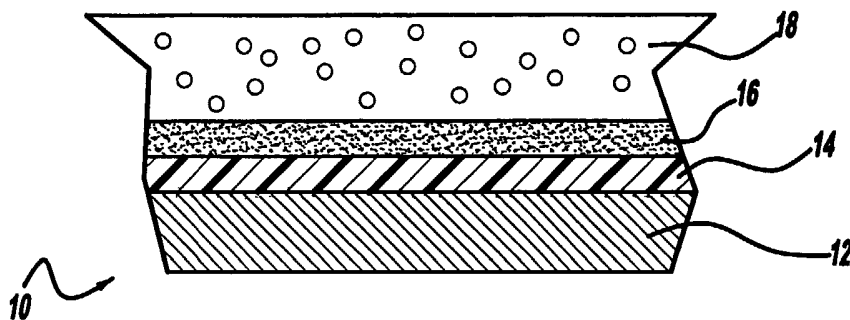
Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
27 May 2004

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: GEL COAT COMPOSITION FOR IN MOLD FINISH PROCESS



(57) Abstract: Composite articles are prepared by a spray up operation. In a first step, a gel coat is applied onto a mold surface (12) which has been optionally pretreated with a mold release coating (14). Next, a barrier coating (16) is applied over the gel coat in the mold and thereafter a laminate formula (18) is applied over the barrier coat (16). The laminate contains from 20-60% by weight reinforcing fibers. In a preferred embodiment, the multilayer composite has a thickness of about 15 mm or less, and is useful as an automobile body panel. The gel coat contains a curable polyester polyurethane acrylate resin, and the composite article has a surface that has high gloss and color retention after prolonged exposure to ultraviolet radiation. The laminate preferably comprises a low shrink, low density glass fiber filled polyester resin. In a preferred embodiment, the paste of the laminate contains a dicyclopentadiene unsaturated polyester resin, polymeric hollow microspheres, and an initiator capable of initiating curing at room temperature or at temperature of 50°C or less.

WO 2004/013236 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/22677

A. CLASSIFICATION OF SUBJECT MATTER		
IPC(7) : B29C 41/02 US CL : 264/255		
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. : 264/255; 257, 278, 299, 324		
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	US 5,562,954 A (HARADA et al.) 08 October 1996 (08.10.1996), col. 2, lines 35-55	1-6, 9-11, 13-18, 21-23
Y	US 6,037,385 A (SMITH) 14 March 2000 (14.03.2000), see Abstract	1, 8, 18-20
Y	JP 05-301295 (SEKISUI CO LTD) 16 November 1993 (16.11.1993), Abstract	7, 12
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> 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	"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
"E"	earlier application or patent published on or after the international filing date	"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
"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)	"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
"O"	document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed	
Date of the actual completion of the international search	Date of mailing of the international search report	
21 March 2004 (21.03.2004)	14 APR 2004	
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. (703)305-3230	Authorized officer Stefan Staicovici Telephone No. 571-272-1700 Jean Procty Paralegal Specialist	