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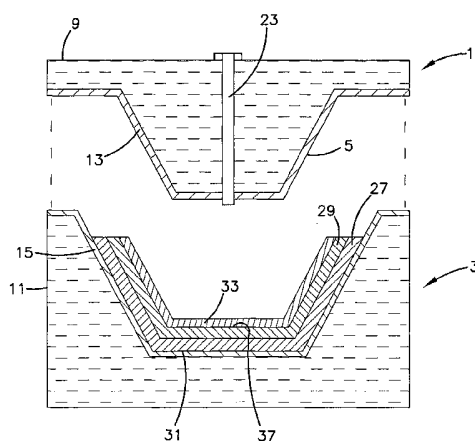
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- (74) Agent: **BRUESS, Steven, C.**; Merchant & Gould P.C., P.O.Box 2903, Minneapolis, MN 55402-0903 (US).
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- (71) Applicant (for all designated States except US): **VEC TECHNOLOGY, INC.** [US/US]; 2900 IDS Center, 80 South Eighth Street, Minneapolis, MN 55402 (US).
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- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **MCCOLLUM, Robert, P.** [US/US]; 34 Linda Drive, Transfer, PA 16150 (US). **SIDI, Shiraz** [CA/US]; 12 Golfwood Drive, Hermitage, PA 16148 (US). **O'HARA, Jeffrey, J.** [US/US]; 313 Jefferson Avenue, Sharon, PA 16146 (US). **CLARK, Richard, Eugene** [US/US]; 59949 Beech Road, Osceola, IN 46561 (US).
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[Continued on next page]

(54) Title: COMPOSITE MOLDED ARTICLE AND METHOD OF MAKING A COMPOSITE MOLDED ARTICLE



(57) Abstract: The invention relates to composite molded articles having a smooth, attractive thermoplastic surface. The invention also relates to a method having improved efficiency and reduced emission of hazardous air pollutants for making composite molded articles comprising a composite fiber reinforcement, thermosetting resin material having a thermoplastic exterior layer. The method comprises the steps of: (a) placing in a spaced apart relationship a first mold half comprising a first shaped mold membrane (5) and a second mold half (3) comprising a second shaped mold membrane (7) wherein the first and second shaped mold membranes define a mold plenum when brought together to mold articles; (b) placing a thermoplastic sheet (25) in the mold plenum wherein the shape of the thermoplastic sheet substantially conforms to the shape of the mold membrane; (c) placing reinforcement material (33) in the mold plenum; (d) closing the first and second mold halves such that the thermoplastic sheet.

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23 December 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.*

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US2004/001843

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC 7 B29C70/48 B29C70/08 B29C51/00 B29C70/86 B32B27/04  
 B32B27/30

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 B32B

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

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 93/23236 A (AMERICAN STANDARD INC) 25 November 1993 (1993-11-25) the whole document	1, 3-5
Y	US 6 143 215 A (MCCOLLUM ROBERT P ET AL) 7 November 2000 (2000-11-07) the whole document	1, 3-5
A	US 4 178 406 A (RUSSELL LARRY M) 11 December 1979 (1979-12-11) cited in the application column 4, line 33 - column 6, line 68	1-5
A	US 5 204 170 A (KUYZIN GREGG S) 20 April 1993 (1993-04-20) claims 1,2	1-5
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Further documents are listed in the continuation of box C.       Patent family members are listed in annex.

° Special categories of cited documents :

<p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*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)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p>	<p>*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</p> <p>*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</p> <p>*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.</p> <p>*Z* document member of the same patent family</p>
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Date of the actual completion of the international search  <b>15 September 2004</b>	Date of mailing of the international search report  <b>07. 10. 2004</b>
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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  <b>Foulger, C</b>
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INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US2004/001843

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 740 028 A (SEKISUI CHEMICAL CO LTD) 30 October 1996 (1996-10-30)	6-10, 13-17,19
Y	claims 1,5,7,9,10,12,14 -----	12,20-23
Y	FR 2 716 102 A (GOTTARDI FERRUCCIO) 18 August 1995 (1995-08-18) claim 1; figure 4 -----	12,20-23
X,P	US 2003/066127 A1 (FIDEL DAVID) 10 April 2003 (2003-04-10)	6-8,11
A,P	paragraphs '0023!, '0040!; claims 1,4,5 -----	9,10, 12-21
E	DE 102 44 284 A (BASF AG) 1 April 2004 (2004-04-01) paragraph '0052!; claim 1 -----	6-21

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2004/001843

## Box 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 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:

see additional 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 an additional fee, this Authority did not invite payment of any additional fee.
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.:

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-5

Independent method claims 1, 3, 4 and 5 relate to a method of fabrication by RTM using a floating mold of an article made of a thermoplastic sheet, a reinforcement and a molding fluid.

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2. claims: 6-24

Independent product claims 6, 14 and 21 relate to a shaped article comprising at least an acrylic polymer layer, a thermoplastic layer with a thickness from 0.5 mm to 15 mm and a fibre reinforced composite.

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## INTERNATIONAL SEARCH REPORT

 International Application No  
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