

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
3 November 2005 (03.11.2005)

PCT

(10) International Publication Number
WO 2005/102667 A3

(51) International Patent Classification⁷: **B29C 49/22**,
45/16, B65D 1/02, 23/08, B29C 37/00

(21) International Application Number:
PCT/US2005/013078

(22) International Filing Date: 18 April 2005 (18.04.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/563,021 16 April 2004 (16.04.2004) US
60/575,231 28 May 2004 (28.05.2004) US
60/586,399 7 July 2004 (07.07.2004) US
60/620,160 18 October 2004 (18.10.2004) US
60/643,008 11 January 2005 (11.01.2005) US

(71) Applicant (for all designated States except US): **ADVANCED PLASTICS TECHNOLOGIES, LTD**
[GB/GB]; 9 Bucklow View, Bowdon Cheshire WA14 3JP (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **HUTCHINSON,**

Gerald [US/US]; 9 Addington Place, Coto de Caza, CA 92679-5128 (US). **LEE, Robert** [GB/GB]; 9 Bucklow View, Bowdon Cheshire WA14 3JP (GB). **FARHA, Said** [US/US]; 12 Crestview Drive, Pleasantville, NY 10570 (US).

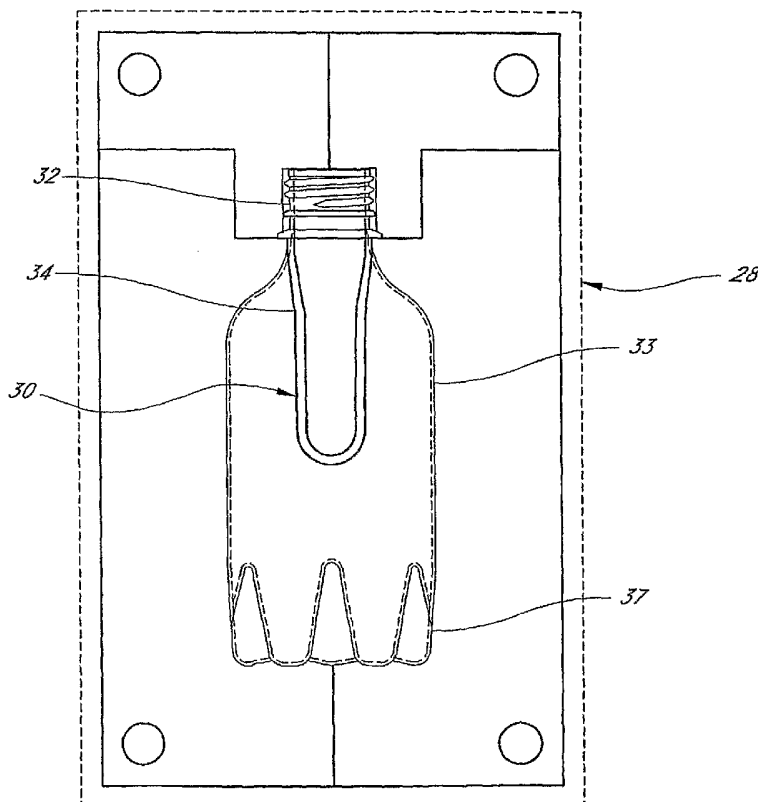
(74) Agent: **DELANEY, Karoline, A.**; Knobbe, Martens, Olson & Bear, LLP, 2040 Main Street, 14th Floor, Irvine, CA 92614 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,

[Continued on next page]

(54) Title: PREFORMS, BOTTLES AND METHODS OF MANUFACTURING THE PREFORMS AND THE BOTTLES



(57) Abstract: A preform comprising a neck portion and a body portion having a wall portion an end cap, the body portion comprising a first layer and a second layer, the second layer comprising an expandable material; a preform comprising a threaded neck portion and a body portion including a wall portio: and an end cap, the body portion comprising expandable material adapted to produce foam when activated; methods of forming the preforms; the bottles manufactured and methods of injection moulding using multiple gates, outlets, exhaust systems or mould cavities.



ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

(88) Date of publication of the international search report:
9 March 2006

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/US2005/013078

A. CLASSIFICATION OF SUBJECT MATTER

B29C49/22 B29C45/16 B65D1/02 B65D23/08 B29C37/00

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)

B65D B29C C08J

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.
X	GB 1 362 133 A (IMPERIAL CHEMICAL INDUSTRIES LTD) 30 July 1974 (1974-07-30)	1-3, 5, 6, 8-19, 21-24, 27, 31-36, 38-43, 45, 46
Y	page 1, line 1 - line 19 page 1, line 73 - line 78 page 2, line 43 - line 100 page 3, line 38 - line 58; claim 2; figures 1-4 ----- -/--	4, 7, 20, 25, 26, 28-30, 44

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

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"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

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"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

14 November 2005

Date of mailing of the international search report

24. 11. 2005

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

Ingelgard, T.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US2005/013078

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2002/132100 A1 (ELFVING KLAS ET AL) 19 September 2002 (2002-09-19) paragraphs '0001!, '0007!, '0008! -----	4,7,20, 26, 28-30,44
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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2005/013078

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 882 559 A (ECKARDT ET AL) 16 March 1999 (1999-03-16) column 5, line 3 - line 20; figures 1,3,5 -----	73,75,76
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2005/013078

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: 1-24, 26-46

Using an insulating foam layer to decrease the heat transfer.

2. claims: 25, 47-76

Methods of and moulds for injection moulding.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2005/013078

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