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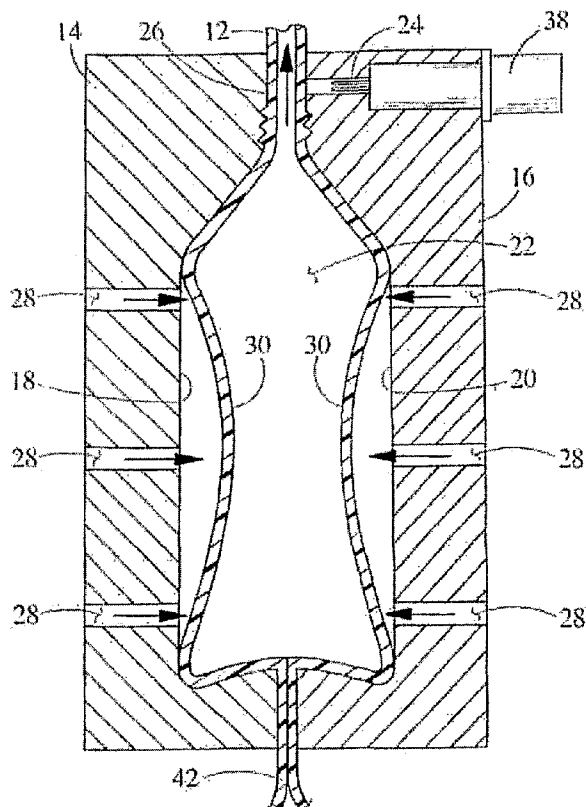
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[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR BLOW MOLDING ASEPTIC CLOSED CONTAINERS



(57) Abstract: An apparatus and method for blow molding and sealing an aseptic container (12). A pair of mold halves (14, 16), including inner surfaces (18, 20) that when closed define a mold cavity, clamp about an extruded parison. The parison is inflated by high pressure blow air into conformity with the shape of the mold cavity (22). An evacuation device applies a force to an exterior portion of the blow molded container causing the portion to deform or flex inwardly, thereby reducing the internal volume and evacuating air from the blow molded container. A sealing tool (24, 38) thereafter causes the blow molded container to be sealed while the container is in the reduced volume condition. Upon removal from the mold assembly and cooling, the container returns to the desired shape.



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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/017301

A. CLASSIFICATION OF SUBJECT MATTER
INV. B29C49/48 B29C49/42

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)
B29C

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, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	WO 01/89940 A (UNILOY MILACRON INC) 29 November 2001 (2001-11-29) page 1, lines 1-6; figures 1-3,8 page 1, line 34 - page 2, line 5 page 3, line 4 - line 12 page 4, line 35 - page 5, line 12	1,5, 14-17,21 11-13, 18,19
X Y	----- US 5 068 075 A (DUNDAS ET AL) 26 November 1991 (1991-11-26) column 1, line 38 - line 55; figures column 2, line 54 - column 3, line 6 column 4, line 30 - column 5, line 47 ----- -/--	1,5, 14-17,21 11-13, 18,19

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

☒ 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
- *E* earlier document but published on or after the international filing date
- *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)
- *O* document referring to an oral disclosure, use, exhibition or other means
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- *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
- *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.
- *Z* document member of the same patent family

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INTERNATIONAL SEARCH REPORT

International application No

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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	PATENT ABSTRACTS OF JAPAN vol. 006, no. 138 (M-145), 27 July 1982 (1982-07-27) -& JP 57 059725 A (TOYO SEIKAN KAISHA LTD), 10 April 1982 (1982-04-10) abstract -----	1,6,15, 22
A	US 5 687 550 A (HANSEN ET AL) 18 November 1997 (1997-11-18) abstract; figures -----	1,6,15, 22
Y	WO 2004/009329 A (AUTOLIV DEVELOPMENT AB; KORECHIKA, KOJI) 29 January 2004 (2004-01-29) figures -----	11-13,18
A	US 4 079 111 A (UHLIG ET AL) 14 March 1978 (1978-03-14) abstract; figures -----	1,2, 15-17 11-13, 18,19

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2006/017301

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: 1-5,15-17,20

Apparatus and method for blow moulding aseptic containers comprising a pair of mating mold halves including inner surfaces that when closed define a mold cavity;
a first source of pressurized air connected to provide blow air to an interior of an extruded parison located within the cavity, whereby the parison is inflated by the blow air to form a blow molded container conforming to the shape of the cavity;
an evacuation device configured to apply pressure to the exterior of the blow molded container to deform the blow molded container into a reduced internal volume condition;
and
a sealing tool being movable between a first position and a second position, the sealing tool being moveable into the second position while the blow molded container is in the reduced internal volume condition thereby sealing the blow molded container and additional that
the evacuation device further comprises a plurality of air passages in fluid communication with the mold cavity, a second source of pressurized coupled to the air passages adapted to deliver pressurized air to the mold cavity between the inner surfaces and the blow molded container therein. [claims 2 and 20]

2. claims: 6-8,22,23

Apparatus and method for blow moulding aseptic containers whereby the evacuation device additional comprises at least one moveable slide, the device further including an actuator coupled to move the slide between a retracted position and an extended position.

3. claims: 9,10,24

Apparatus and method for blow moulding aseptic containers whereby the evacuation device additional comprises at least one inflatable membrane and a second source of pressurized air coupled to the inflatable membrane to deliver pressurized air to the inflatable membrane.

4. claims: 11-13,18,19

Apparatus and method for blow moulding aseptic containers wherein the evacuation device is part of an evacuation station separate from a molding station.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

5. claim: 14

Apparatus for blow moulding aseptic containers additional comprising that the evacuation device is located in a position on the mold half such that the device defines a surface corresponding to at least a portion of a side wall of the container defined by the mold cavity.

6. claim: 21

Method for blow moulding aseptic containers additional comprising the steps of allowing the blow molded container to cool, shrinking the sealed blow molded container and deforming a portion of the sealed blow molded container outward into a final shape.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2006/017301

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0189940	A	29-11-2001	AU 3482701 A EP 1283801 A1 US 7150624 B1	03-12-2001 19-02-2003 19-12-2006
US 5068075	A	26-11-1991	NONE	
JP 57059725	A	10-04-1982	JP 1009225 B JP 1524001 C	16-02-1989 12-10-1989
US 5687550	A	18-11-1997	AU 695253 B2 AU 3665495 A CA 2161175 A1 DE 4439231 C1 DK 710604 T3 EP 0710604 A1 ES 2113704 T3 FI 955236 A JP 2801874 B2 JP 8207126 A NO 954385 A	13-08-1998 09-05-1996 04-05-1996 25-04-1996 11-01-1999 08-05-1996 01-05-1998 04-05-1996 21-09-1998 13-08-1996 06-05-1996
WO 2004009329	A	29-01-2004	AU 2003281618 A1 JP 2006027285 A	09-02-2004 02-02-2006
US 4079111	A	14-03-1978	NONE	