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61/690,727 3 July 2012 (03.07.2012) US

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

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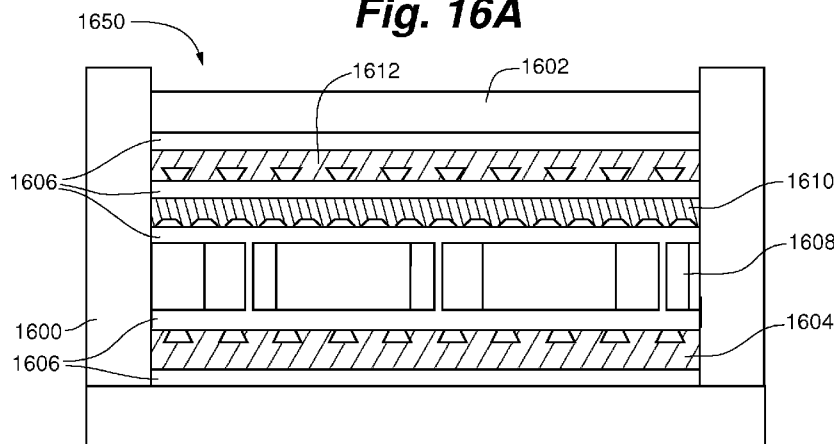
- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

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16 January 2014

(54) Title: THERMAL ISOLATION FOR CASTING ARTICLES

Fig. 16A



(57) Abstract: Some embodiments provide methods and systems for casting articles. One example of a method includes providing and positioning a thermal blanket within a mold cavity and then introducing a molten material into the mold cavity and into contact with the thermal blanket. The method allows the molten material to remain in a molten state during a dwell time that extends from the introduction of the molten material at least until the mold cavity is filled. In another example, a method of using a thermal blanket includes keeping a molten material in a molten state during a dwell time extending from first introduction of the molten material until pressurization. Systems including a variety of mold types, one or more thermal blankets, and in some cases preforms and/or inserts are also provided. Also described is a novel thermal blanket and method of manufacturing the same.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/035890

A. CLASSIFICATION OF SUBJECT MATTER INV. B22D19/08 B22D19/14 B22C9/12 B22D17/00 C04B30/02 B22D27/04 B22C3/00 ADD.																	
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) B22D B22C C04B 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) EPO-Internal, WPI Data																	
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>US 2003/019604 A1 (ISHIDUKA MASANOBU [JP] ET AL) 30 January 2003 (2003-01-30) paragraph [0012]; figures -----</td> <td>1-44</td> </tr> <tr> <td>X</td> <td>EP 0 151 952 A1 (MASCHF AUGSBURG NUERNBERG AG [DE]) 21 August 1985 (1985-08-21) claim 7 -----</td> <td>1,11,27</td> </tr> <tr> <td>X</td> <td>US 4 232 091 A (GRIMSHAW REX W ET AL) 4 November 1980 (1980-11-04) claims -----</td> <td>1,11,27</td> </tr> <tr> <td>X</td> <td>EP 0 230 192 A1 (PEUGEOT [FR]; CITROEN SA [FR]) 29 July 1987 (1987-07-29) claims; figures ----- -/-</td> <td>1,11,27</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	US 2003/019604 A1 (ISHIDUKA MASANOBU [JP] ET AL) 30 January 2003 (2003-01-30) paragraph [0012]; figures -----	1-44	X	EP 0 151 952 A1 (MASCHF AUGSBURG NUERNBERG AG [DE]) 21 August 1985 (1985-08-21) claim 7 -----	1,11,27	X	US 4 232 091 A (GRIMSHAW REX W ET AL) 4 November 1980 (1980-11-04) claims -----	1,11,27	X	EP 0 230 192 A1 (PEUGEOT [FR]; CITROEN SA [FR]) 29 July 1987 (1987-07-29) claims; figures ----- -/-	1,11,27
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X	US 2003/019604 A1 (ISHIDUKA MASANOBU [JP] ET AL) 30 January 2003 (2003-01-30) paragraph [0012]; figures -----	1-44															
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☒ 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 application or patent 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 "P" document published prior to the international filing date but later than the priority date claimed "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 "&" document member of the same patent family																	
Date of the actual completion of the international search		Date of mailing of the international search report															
6 August 2013		29/11/2013															
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Hodiamont, Susanna															

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/035890

Box No. 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 No. 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 fees, this Authority did not invite payment of additional fees.
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.:

1-44

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/035890

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 4 546 048 A (GUENTHER WILLIAM D [US]) 8 October 1985 (1985-10-08) claims; figures -----	1,11,27
X	GB 2 106 433 A (AE PLC [GB]) 13 April 1983 (1983-04-13) page 2, lines 2-5; figure -----	1,11,27
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2013/035890

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-44

Claims 1-10: Method for casting an article wherein the molten material within the mold cavity remains in a molten state during a dwell time extending from the introducing of the molten material into the mold cavity at least until the molten material fills the mold cavity

Claims 11-26: Method for casting an article wherein the molten material within the mold cavity remains in a molten state during a dwell time extending from the introducing of the molten material into the mold cavity at least until the molten material fills the mold cavity.

Claims 27-44: System for carrying out the methods of claims 1-10 and 11-26

2. claims: 45-50

Claims 45-47: Thermal blanket with sublayers

Claims 48-50: Method of making a thermal blanket with sublayers
