Abstract: Various enhanced features are provided for centrifugal casting apparatuses, rotatable assemblies, and molds for casting products from molten materials. These enhanced features include, among others, tapered gate portions positioned adjacent to the cavities of a mold, extended and shared gating systems, and detachable mold structures for modifying the thermodynamic characteristics and behavior of molds during casting operations.
A. CLASSIFICATION OF SUBJECT MATTER

According to International Patent Classification (IPC) or both national classification and IPC

B22D13/06 B22D13/10 B22C9/08 B22D27/04

ADD.

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B22D

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

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<th>Relevant to claim No.</th>
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<td>JP H08 206807 A (MITSUBISHI MATERIALS CORP) 13 August 1996 (1996-08-13) abstract; figures 1-4</td>
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</table>

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
  
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  "O" document referring to an oral disclosure, use, exhibition or other means
  
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Date of the actual completion of the international search: 15 January 2015

Date of mailing of the international search report: 23/01/2015

Authorized officer: Baumgartner, Robin
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<td>EP 0 686 443 Al (ALD VACUUM TECHN GMBH [DE]) 13 December 1995 (1995-12-13)</td>
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</table>
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).

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.:
   1-27, 35-39, 42-47

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

1. claims: 1-4, 6, 7, 13-16, 35-38
   Centrifugal casting apparatus / mold / method, with additional features of stacked cavities and relating to the geometry and structure of mold and cavity.
   ---

2. claims: 5, 8-12, 17-25, 39
   Centrifugal casting apparatus / mold / method, with additional features of stacked cavities and relating to directional solidification, heat extraction, heat transfer
   ---

3. claims: 26, 27, 42-47
   Centrifugal casting mold, with additional features to the geometry of the cavity.
   ---

4. claims: 28-33
   Centrifugal casting mold, with additional features relating to directional solidification, heat extraction, heat transfer
   ---

5. claims: 40, 41
   Centrifugal casting apparatus assembly method, with additional features relating to a wedge and sealing engagement of mold with the wedge
   ---

6. claims: 48-57
   Centrifugal casting mold, with additional features to the geometry of the gate.
   ---

7. claims: 34, 58-61
   Centrifugal casting mold, with additional features to extended gate and the cavity cavity is structured for producing a cast component capable of sub-division into multiple sub-components.
   ---

8. claims: 62, 63
   Centrifugal casting mold, with additional features two two cavities having an entry port and a common gate
9. claims: 64-68

Centrifugal casting mold, with additional features of different materials on and back wall ports.

10. claims: 69, 70

Centrifugal casting mold, with additional features of a slot formed adjacent to the entry port of the cavity.
INTERNATIONAL SEARCH REPORT
Information on patent family members

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Form PCT/ISA210 (patent family annex) (April 2005)