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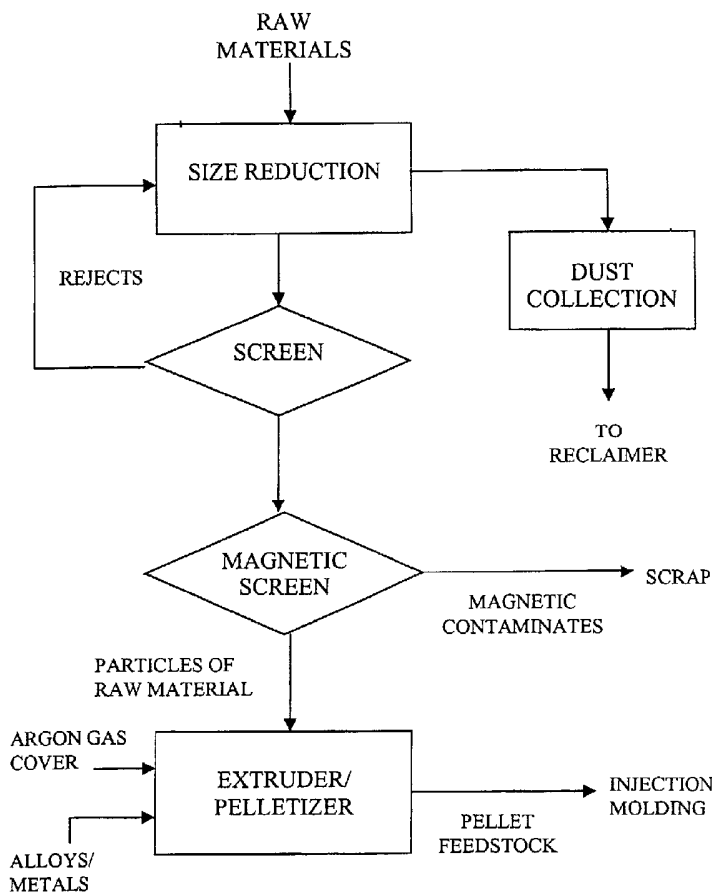
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[Continued on next page]

(54) Title: FEEDSTOCK MATERIALS FOR SEMI-SOLID FORMING



(57) Abstract: Disclosed is a method for producing feedstock materials for semi-solid forming comprising reducing the size of raw material, introducing the raw material into an extruder and extruding the raw material to produce feedstock material having a non-dendritic microstructure. Further disclosed is an apparatus for producing feedstock materials for semi-solid forming comprising an extruder, a feeder with means for maintaining raw material under a protective atmosphere, a nozzle on an end of the extruder with means for maintaining an extrudate under a protective atmosphere, temperature control means within the extruder and a pelletizer for pelletizing the extrudate. Additionally disclosed is a system for producing feedstock materials for semi-solid forming comprising a size reduction station, a magnetic screen, an extruder comprising a semi-solid raw material and a pelletizer .

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INTERNATIONAL SEARCH REPORT

International Application No

PC/US 02/32721

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 B22F3/20 B22D17/00 C22C1/00

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)

IPC 7 B22F B22D C22C

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 080 787 A (DOW CHEMICAL CO) 8 June 1983 (1983-06-08) page 8, line 6 -page 10, line 3; claims 1,2,4,6; example 1 ---	1-7,19, 28-33
A	WO 94 06586 A (COMALCO ALU ;KJAR ANTHONY R (AU); MIHELICH JOHN LOUIS (US); GERMAN) 31 March 1994 (1994-03-31) page 2, line 17 - line 36 -----	31

 Further documents are listed in the continuation of box C.

 Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"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

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Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 02/32721

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 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.:

1-7, 19, 28-33

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: 1-7, 19, 28-33

Process for the production of feedstock material for semi-solid forming, by size reduction and extrusion, feedstock produced in such a way and injection moulding process using said feedstock.

2. Claims: 8-10, 27

Process for the production of feedstock material for semi-solid forming, by extrusion with the addition of alloying elements during the extrusion.

3. Claims: 11-12, 20, 24

Process for the production of feedstock material for semi-solid forming, by extrusion with the use of an inert atmosphere

4. Claims: 13-15, 25

Process for the production of feedstock material for semi-solid forming, by extrusion with particular shear rate and rotation speed, remove the dendritic structures

5. Claims: 16-18, 26

Process for the production of feedstock material for semi-solid forming, by extrusion using flashing and vacuum to remove volatiles

6. Claims: 21-23

Process for the production of feedstock material for semi-solid forming, by extrusion with a final pelletizing step.

7. Claims: 34-50

Apparatus suitable for producing feedstock materials for semi-solid forming comprising an extruder, means for maintaining an inert atmosphere, controlling the temperature and a pelletizer

8. Claims: 51-52

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

System for producing feedstock materials for semi-solid forming comprising size reduction and separation devices, extruder and pelletizer

9. Claim : 53

Extruder suitable for semi-solid metal extrusion comprising a downstream feeder for introducing alloying elements.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 02/32721

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