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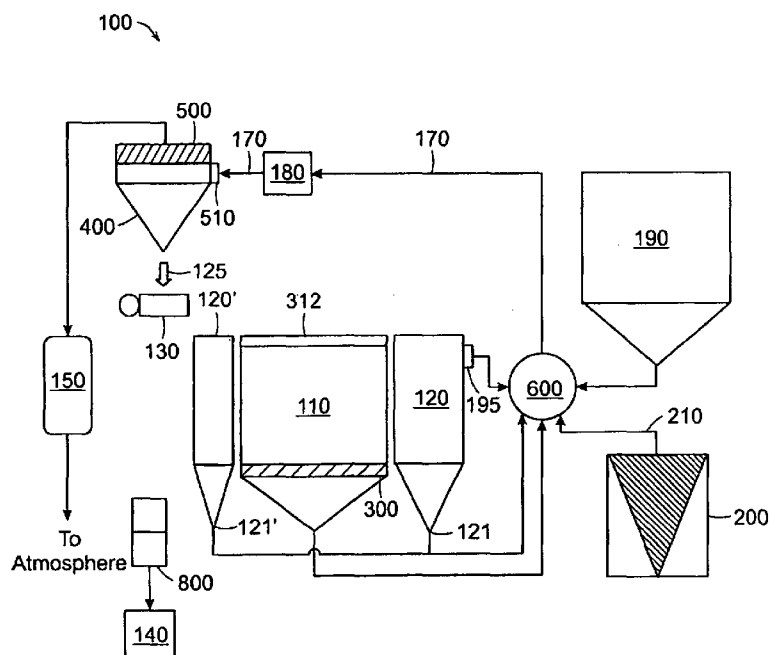
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[Continued on next page]

(54) Title: APPARATUS AND METHODS FOR HANDLING MATERIALS IN A 3-D PRINTER



(57) Abstract: The present invention is directed towards methods and apparatus for handling powder in a 3D printer. The invention includes a means of transporting powder from multiple sources to a powder dispensing apparatus with minimal user intervention, thus reducing contamination of the 3D printer and surrounding area with loose powder, while also providing a means of improving the recycling of powder for re-use.

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. B29C67/00 B29C31/02

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, 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	WO 03/026876 A (CORP Z [US]) 3 April 2003 (2003-04-03) page 13, line 17 - page 14, line 19 page 16, line 7 - line 10 -----	1,3-6,9, 12
X	WO 95/34468 A (SOLIGEN INC [US]) 21 December 1995 (1995-12-21) page 21, line 9 - line 28 -----	1,3,5,9, 12

☐ 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
- *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.
- *G* document member of the same patent family

Date of the actual completion of the international search

8 January 2008

Date of mailing of the international search report

26/03/2008

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2007/012494

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 allsearchable 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.:

1-17

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-17

a power handling system for a three dimensional printer and
a multiport valve for directing powder flow.

2. claims: 18-20

an electrical connection system

3. claims: 21-32

a powder dispensing hopper

4. claims: 33-40

a filter system

5. claims: 41-60

a build chamber and a method of controlling the flow of
unbound powder.

6. claims: 61-68

a container for holding powder

7. claims: 69-75

a printhead capping station

8. claims: 76-80

a waste handling system

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2007/012494

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 03026876	A	03-04-2003	CA 2460447 A1	03-04-2003
			EP 1429911 A2	23-06-2004
			JP 2005503939 T	10-02-2005
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WO 9534468	A	21-12-1995	NONE	
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