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**Published**:

— *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))*

(88) Date of publication of the international search report:
15 April 2010

(54) Title: IMPROVED POWDER DISPENSER MODULES AND POWDER DISPENSER ASSEMBLIES

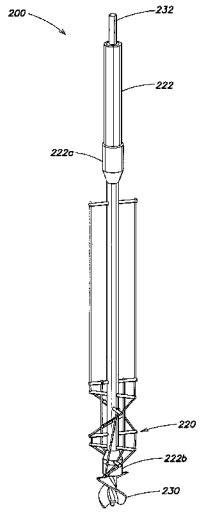



FIG. 10

(57) Abstract: A powder dispenser module (54) includes a housing (150) that defines a conduit connecting a powder inlet and a powder outlet, a feed wand (160) to move powder through the conduit from the powder inlet to the powder outlet, the feed wand (200) including a lower feed element (230) coupled to a first drive shaft and an upper feed element (220) coupled to a second drive shaft, a first actuator coupled to the first drive shaft to rotate the lower feed element (230), and a second actuator coupled to the second drive shaft to rotate the upper feed element (220). In other embodiments, the feed wand (200) includes a shaft having a fluidizing element and an actuator produces oscillatory movement of the feed wand during dispensing of powder. Dispenser module arrays include one or a few rows of dispenser modules.

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# INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/004500

**A. CLASSIFICATION OF SUBJECT MATTER**
INV. B65B1/12 B65B1/30 B65B1/32

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)
B65B

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

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| Y | US 2007/131707 A1 (POOLE TRENT A [US] ET AL) 14 June 2007 (2007-06-14) cited in the application the whole document | 1-11 |
| Y | US 4 164 244 A (MEIER SIEGFRIED [CH]) 14 August 1979 (1979-08-14) the whole document | 1-11 |
| Y | DE 10 2006 018279 A1 (BOHLE L B PHARMATECH GMBH [DE]) 25 October 2007 (2007-10-25) paragraphs 22,31 - pages 1,3 | 9-11 |

☐ 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.

"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 12 November 2009 | 24/02/2010 |

| Name and mailing address of the ISA/ | Authorized officer |
|---|---|
| European Patent Office, P.B. 5818 Patentlaan 2<br>NL – 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040,<br>Fax: (+31-70) 340-3016 | Schelle, Joseph |

# INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/004500

**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.:

see annex

**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: 1-11,22,33,34

A powder dispenser module as known from US 2007/0131707 A1, wherein the lower feed element is coupled to a first actuator via a first drive shaft and the upper feed element is coupled to a second actuator via a second drive shaft.
A method made possible by the above actuator.
A powder dispensing and sensing apparatus incorporating one or more such powder dispenser modules.

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2. claims: 12-15,33,34

A powder dispenser module as known from US 2007/0131707 A1, wherein the valve member rotates about an axis perpendicular to an axis of the feed wand assembly.
A powder dispensing and sensing apparatus incorporating one or more such powder dispenser modules.

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3. claims: 16-21

A powder dispensing and sensing apparatus as known from US 2007/0131707 A1, wherein the control system includes an embedded processor in each of the power dispenser modules

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4. claims: 23-28

A powder dispensing and sensing apparatus as known from US 2007/0131707 A1, wherein a sensor module includes a plurality of sensor cells

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5. claims: 29-32,33,34,35

A powder dispenser module as known from US 2007/0131707 A1, wherein an actuator produces oscillatory movement of the feed wand during dispensing of the powder.
A powder dispensing and sensing apparatus incorporating one or more such powder dispenser modules.
A method made possible by the above actuator.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2009/004500

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| DE 102006018279 A1 | 25-10-2007 | NONE | |