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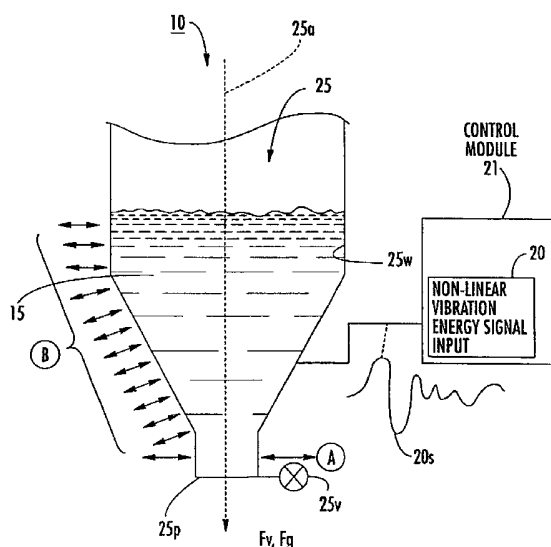
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(54) Title: DRY POWDER DOSE FILLING SYSTEMS AND RELATED METHODS



(57) Abstract: Methods for flowably dispensing dry powders from a hopper having a dispensing port and a dry powder flow path can include: (a) generating a first non-linear vibration input signal, the first non-linear input signal comprising a plurality of different selected frequencies that correspond to a first dry powder formulation; (b) applying the first non-linear vibration input signal to a dispensing hopper having at least one dispensing port while the first dry powder formulation is flowing therethrough; and (c) dispensing a first meted quantity of the first dry powder through the dispensing port to a receiving member. Related devices and computer program products for dispensing dry powders are also described.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/US03/20842

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
IPC(7) : A61M 13/00; A62B 18/08; H01L 41/04; B01F 11/02		
US CL : 604/58; 128/203.15; 310/311; 366/127; 222/161		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) U.S. : Please See Continuation Sheet		
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) Please See Continuation Sheet		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,167,880 B1 (GONDA et al) 2 January 2001 (02.01.2001), whole document.	1-73
X	US 5,618,177 A (ABBOTT) 8 April 1997 (08.04.1997), whole document.	1-9, 13-14, 16-28, 73
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Y		10-12, 15, 29-72
Y	US 6,152,130 A (ABRAMS et al) 28 November 2000 (28.11.2000), whole document.	1-73
Y	US 4,472,091 A (CALLAHAN) 18 September 1984 (18.09.1984), whole document.	1-9, 13-14, 16-28, 73
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> 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	"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
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"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)	"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
"O"	document referring to an oral disclosure, use, exhibition or other means	
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**Continuation of B. FIELDS SEARCHED Item 1:**

604/58; 128/203.15, 203.12, 203.19, 203.21, 203.23; 310/311, 313R, 313A, 318, 322, 323.06, 330, 334; 366/127; 222/161, 164-166, 196, 196.1, 202, 203

**Continuation of B. FIELDS SEARCHED Item 3:**

EAST search terms: piezoelectric, vibration/flexing, flow channel, dispense dry powder, pharmaceutical, medicament, MDI/metered dose inhaler, excitation signal, signal generator