



(12) **United States Patent**  
**Canty et al.**

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(54) **GRANULAR PRODUCT INSPECTION DEVICE**

4,540,286 A \* 9/1985 Satake et al. .... 356/445  
4,830,194 A 5/1989 Kajiura et al. .... 209/580

(75) Inventors: **Thomas M. Canty**, Williamsville, NY (US); **Paul J. O'Brien**, East Aurora, NY (US); **Christian P. Marks**, Cheektowaga, NY (US); **Richard E. Owen**, Youngstown, NY (US)

(Continued)

**FOREIGN PATENT DOCUMENTS**

DE 10125277 9/2002

(73) Assignee: **J.M. Canty Inc.**, Buffalo, NY (US)

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 805 days.

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**OTHER PUBLICATIONS**

(21) Appl. No.: **10/740,244**

PartAn Laboratory Analyzer, <http://www.sci-tec-inc.com/plaboratory.html>, pp. 1-2, Sci-Tec Inc., Dec. 15, 2003.

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*Primary Examiner*—Sang Nguyen  
(74) *Attorney, Agent, or Firm*—Darby & Darby

**Related U.S. Application Data**

(57) **ABSTRACT**

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**B07C 5/342** (2006.01)

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See application file for complete search history.

An inspection device for inspecting a granular product includes a feed tray having a receiving region for receiving the granular product and an imaging region and a vibration device configured to impart vibrations to the feed tray for moving granules of the granular product from the receiving region to the imaging region. The inspection device also includes an image capturing device configured to capture an image of a sample of the granular product in an image area of the imaging region. In addition, a method for inspecting a granular product includes disposing the granular product on a receiving region of a feed tray, vibrating the feed tray so as to induce a movement of the granular product from the receiving region of the feed tray to an imaging region of the feed tray, and capturing an image of a sample of the granular product in an image area of the imaging region.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

4,338,024 A 7/1982 Bolz et al. .... 356/23

**29 Claims, 5 Drawing Sheets**

