

The
United
States
of
America



The Director of the United States
Patent and Trademark Office

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, or importing into the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

Michelle K. Lee

Director of the United States Patent and Trademark Office



US008997592B2

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

(10) **Patent No.:** **US 8,997,592 B2**
(45) **Date of Patent:** **Apr. 7, 2015**

(54) **ASSEMBLY AND METHOD FOR IC UNIT ENGAGEMENT**

(58) **Field of Classification Search**
CPC H05K 13/0408; B65H 2404/00; B65H 2406/00

(75) Inventors: **Hae Choon Yang**, Singapore (SG); **Jong Jae Jung**, Singapore (SG); **Deok Chun Jang**, Singapore (SG); **Chong Chen Gary Lim**, Singapore (SG)

USPC 74/55, 665; 414/266, 277, 797, 627
See application file for complete search history.

(73) Assignee: **Rokko Systems Pte Ltd**, Singapore (SG)

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,666,358 A * 5/1987 Wojciechowski 414/223.01
5,603,599 A * 2/1997 Wesslen et al. 414/411
6,152,755 A 11/2000 Lee
6,175,466 B1 1/2001 Hori et al.

(Continued)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 319 days.

FOREIGN PATENT DOCUMENTS

(21) Appl. No.: **13/518,973**

WO 2006/022597 A2 3/2006

(22) PCT Filed: **Dec. 23, 2010**

OTHER PUBLICATIONS

(86) PCT No.: **PCT/SG2010/000484**

§ 371 (c)(1),
(2), (4) Date: **Jun. 25, 2012**

International Search Report (PCT/ISA/210) and Written Opinion (PCT/ISA/237) for corresponding PCT International Application No. PCT/SG2010/000484 completed on Mar. 3, 2011 and mailed on Mar. 9, 2011.

(Continued)

(87) PCT Pub. No.: **WO2011/078802**

PCT Pub. Date: **Jun. 30, 2011**

Primary Examiner — David M Fenstermacher

(65) **Prior Publication Data**

US 2012/0260752 A1 Oct. 18, 2012

(74) *Attorney, Agent, or Firm* — Heslin Rothenberg Farley & Mesiti P.C.; Victor A. Cardona

(30) **Foreign Application Priority Data**

Dec. 23, 2009 (SG) 200908618-2

(57) **ABSTRACT**

A picker assembly includes a plurality of pickers in selective variable spaced relation, a shaft having a plurality of cam plates, the cam plates co-axial with said shaft and having a variable thickness. The cam plates are in engagement with the pickers and positioned in interstitial spaces between the pickers. The selective variability in spacing is provided by rotation of the shaft such that thickness variation of the cam plates move the respective pickers along an axis parallel to the shaft.

19 Claims, 9 Drawing Sheets

(51) **Int. Cl.**
H01L 21/677 (2006.01)
B65H 29/00 (2006.01)
H05K 13/04 (2006.01)

(52) **U.S. Cl.**
CPC **H05K 13/0408** (2013.01)

