

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau



RTMP
copy

86 9701112-6

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification⁶ : H05K	A2	(11) International Publication Number: WO 96/09744 (43) International Publication Date: 28 March 1996 (28.03.96)
(21) International Application Number: PCT/US95/12353 (22) International Filing Date: 14 September 1995 (14.09.95) (30) Priority Data: 08/306,144 14 September 1994 (14.09.94) ✓ US 08/504,521 20 July 1995 (20.07.95) US (71) Applicant: VANGUARD AUTOMATION, INC. [US/US]; 10900 North Stallard Place, Tucson, AZ 85737 (US). (72) Inventor: MCGILL, Scott, D.; 3431 North Calle Largo, Tucson, AZ 85715 (US). (74) Agent: STANGER, Leo; Stanger & Dreyfus, P.C., 382 Springfield Avenue, P.O. Box 1455, Summit, NJ 07901 (US).		(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, <u>SG</u> , SI, SK, TJ, TM, TT, UA, UG, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ, UG). Published <i>Without international search report and to be republished upon receipt of that report.</i>
(54) Title: METHOD AND APPARATUS FOR FILLING A BALL GRID ARRAY (57) Abstract A work cell for populating a ball grid array employs gravity for transferring solder balls from a tooling plate to the ball grid array. The tooling plate is positioned on a gantry along with a reservoir for solder balls. The gantry, along with the tooling plate and reservoir, is rotated, in one embodiment, through about one hundred and eighty degrees to spread the solder balls over the tooling plate and to recapture loose solder balls as the gantry rotates. A riser cylinder moves a ball grid array into juxtaposition with the populated tooling plate prior to the point (i.e. angle of rotation) at which gravity operates to drop the solder balls out of the tooling plate. Further rotation results in gravity transfer of the solder balls to a (fluxed) ball grid array. Apparatus employing more than one work cell is also described.		