

DESCRIPTION OF THE EMBODIMENTS

[0019] Hereinafter, a bonding apparatus 100 which is an electronic component mounting apparatus of an embodiment is described with reference to the drawings. The bonding apparatus 100 mounts a semiconductor die 16 which is an electronic component on a substrate 15 or on another semiconductor die 16. In the following description, Z axis is directed in a direction that is perpendicular to both X axis and Y axis, which orthogonally intersect one another.

[0020] As shown in FIG. 1, the bonding apparatus 100 includes: a base 10; a common linear guide 20 that is attached to the base 10 and extends in the Y direction which is a predetermined direction; a plurality of mounting heads 21a and 21b that are guided by the linear guide 20 to move in the Y direction; a control unit 50 that adjusts the positions of the two mounting heads 21a and 21b in the Y direction.

[0021] In addition, as shown in FIG. 1, the base 10 of the bonding apparatus 100 is provided with two sets of transfer rails 11a and 11b that transfer the substrate 15 in the X direction, and two mounting stages 12a and 12b. Furthermore, the bonding apparatus 100 includes a guide frame 32 which is attached to the base 10 and extends in the X direction, a pickup head 33 that is guided by the guide frame 32 to move in the X direction, a guide rail 30 which is attached to the base 10 and extends in the Y direction, an intermediate stage 31 that is guided by the guide rail 30 to move in the Y direction, and a wafer holder (not shown) that holds a wafer 35.

[0022] Y-direction positions of the centers of the two mounting stages 12a and 12b are 12c and 12d respectively, and the distance between the centers of the mounting stages 12a and 12b in the Y direction is W1. Further, two placing tables 17 which place and pick up the semiconductor die 16 are arranged on the upper surface of the intermediate stage 31. The interval between the two placing tables 17 in the Y direction is W1, which is equal to the interval between the mounting stages 12a and 12b in the Y direction.

[0023] The intermediate stage 31 moves in the Y direction between a first position shown by a

d in FIG. 12 show the change in Y-direction position along with time of each of the mounting heads 21a and 21b.

[0041] The control unit 50 causes each of the mounting heads 21a and 21b to start to move simultaneously at time t_0 as shown by the dot-chain line e and the solid line b shown in FIG. 11.

5 Because the mounting head 21b on the front side has a short moving distance, the acceleration is stopped at time t_{11} and the mounting head 21b moves in the Y direction at a constant speed slower than the mounting head 21a on the back side. Meanwhile, as described above, the mounting head 21a on the back side continues to accelerate until time t_1 and moves at a constant speed from time t_1 . Then, the mounting head 21a on the back side starts to decelerate from time t_2 , reaches the
10 mounting position 14a1 at time t_3 , and becomes zero speed at time t_3 . The mounting head 21b on the front side continues to move at a constant speed until time t_{12} , starts to decelerate from time t_{12} , reaches the mounting position 14b at time t_3 , and becomes zero speed at time t_3 .

[0042] After the movement of each of the mounting heads 21a and 21b in the Y direction is stopped at time t_3 , the control unit 50 mounts the semiconductor dies 16 sucked by each of the
15 mounting nozzles 22a and 22b of the mounting heads 21a and 21b on each substrate 15. Then, when the mounting of each semiconductor die 16 onto each substrate 15 is completed, as shown in FIG. 10, the control unit 50 causes each of the mounting heads 21a and 21b to move to the initial position, causes the intermediate stage 31 to move to the first position, and continues the pickup mounting operation of the next semiconductor die 16.

20 **[0043]** As described above, in the bonding apparatus 100 of the embodiment, when the distances ΔY_{a1} and ΔY_b between the pickup positions 13a and 13b and the mounting positions 14a1 and 14b are different, the moving speed of the mounting head 21b which has a shorter moving distance is made to be slower than the moving speed of the mounting head 21a which has a longer moving distance. Thereby, even when the distances ΔY_{a1} and ΔY_b between the pickup positions 13a
25 and 13b and the mounting positions 14a1 and 14b are different, it is possible to cause the two

each of the mounting nozzles 22a, 22b, 22c and 22d of each of the mounting heads 21a, 21b, 21c and 21d become the pickup positions 13a and 13b, as shown in FIG. 14. At this time, the control unit 50 causes each of the mounting heads 21a, 21b, 21c and 21d to start to move simultaneously toward the minus side in the Y direction from the initial position, causes the centers of each of the mounting nozzles 22a, 22b, 22c and 22d to reach the pickup positions 13a and 13b simultaneously, and causes each of the mounting heads 21a, 21b, 21c and 21d to stop moving to the minus side in the Y direction simultaneously. Then, the control unit 50 causes the front end of each of the mounting nozzles 22a, 22b, 22c and 22d of each of the mounting heads 21a, 21b, 21c and 21d to suck the semiconductor die 16.

[0050] As described above with reference to FIG 5, the control unit 50 causes each of the mounting heads 21a, 21b, 21c and 21d to move from the pickup positions 13a and 13b to the mounting positions 14a and 14b. At this time, the control unit 50 causes each of the mounting heads 21a, 21b, 21c and 21d to start to move simultaneously toward the plus side in the Y direction, causes the center of each of the mounting nozzles 22a, 22b, 22c and 22d to reach the mounting positions 14a and 14b simultaneously, and causes each of the mounting heads 21a, 21b, 21c and 21d to stop moving to the plus side in the Y direction simultaneously.

[0051] After the movement of each of the mounting heads 21a, 21b, 21c and 21d to the mounting positions 14a and 14b is completed and each of the mounting heads 21a, 21b, 21c and 21d is stopped, the control unit 50 causes each of the mounting nozzles 22a, 22b, 22c and 22d to descend and mounts the semiconductor dies 16 sucked at the front end of each of the mounting nozzles 22a, 22b, 22c and 22d on each substrate 15.

[0052] In addition to functions and effects of the bonding apparatus 100, the bonding apparatus 200 of the present embodiment can further reduce the installation space than the bonding apparatus 100, and because four semiconductor dies 16 can be mounted simultaneously by four mounting heads 21a, 21b, 21c and 21d, the mounting speed can be further increased.

[0053] In addition, in the above description, the two pickup heads 33 pick up the semiconductor

dies 16 from the two wafers 35 respectively and place the semiconductor die 16 on each placing table 17 of the intermediate stage 31, but the present invention is not limited hereto. For example, each pickup head 33 may pick up the semiconductor die 16 from one wafer 35 respectively and place the semiconductor die 16 on each placing table 17 of each intermediate stage 31.

5 [Reference Signs List]

	[0054]	10	base
		11a, 11b	transfer rail
		12a, 12b	mounting stage
		12c, 12d	Y-direction position
10		13a, 13b	pickup position
		14a, 14a1, 14b	mounting position
		15	substrate
		16	semiconductor die
15		17	placing table
		20	linear guide
		21a, 21b, 21c, 21d	mounting head
		22a, 22b, 22c, 22d	mounting nozzle
20		30	guide rail
		31	intermediate stage
		32	guide frame
		33	pickup head
25		34	pickup nozzle
		35	wafer
		50	control unit
		100, 200	bonding apparatus