

ELECTRONIC COMPONENT MOUNTING APPARATUS

BACKGROUND

5 Technical Field

[0001] The present invention relates to a structure of an electronic component mounting apparatus.

Related Art

[0002] As a mounting apparatus that mounts an electronic component on a substrate, the
10 mounting apparatus has been used which includes a pickup unit that picks up a semiconductor die from a wafer and places the semiconductor die on an intermediate stage, and a bonding unit that picks up the semiconductor die from the intermediate stage, transfers the semiconductor die to the substrate and bonds the semiconductor die on the substrate.

[0003] In addition, as the mounting apparatus, there has been proposed an apparatus which
15 includes two pickup units and two bonding units, and alternately performs the pickup and the bonding to shorten the bonding time (for example, see patent literature 1).

[Literature of related art]

[Patent literature]

[0004] Patent literature 1: Japanese Patent Laid-open No. 2009-130583
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SUMMARY

[Problems to be Solved]

[0005] However, in the mounting apparatus described in patent literature 1, two mounting heads
are arranged side by side in a direction orthogonal to a support arm, so that a large installation
25 space is required. Further, because the pickup and the bonding are performed alternately, during

the bonding of one mounting head, the vibration caused by the operation of the other mounting head may interfere and mounting precision may be influenced. The influence becomes more remarkable when the mounting head is moved at a high speed to shorten the mounting time.

[0006] Therefore, the purpose of the present invention is to reduce the installation space and improve the mounting precision in an electronic component mounting apparatus including a plurality of mounting heads.

[Means to Solve the Problems]

[0007] The present invention is an electronic component mounting apparatus which mounts an electronic component on a substrate or another electronic component, and includes a linear guide configured to extend in a predetermined direction, a plurality of mounting heads arranged side by side in the predetermined direction and are guided by the linear guide to move in the predetermined direction, and a control unit configured to adjust positions of the mounting heads in the predetermined direction. The control unit is configured to cause each of the mounting heads to start to move simultaneously toward the same direction, and cause each of the mounting heads to stop simultaneously.

[0008] In this way, by arranging the mounting heads side by side in the predetermined direction, it is possible to reduce the installation space. Further, by causing the plurality of mounting heads to start to move simultaneously and stop simultaneously, it is possible to prevent the interference of the vibration caused by the operation of each mounting head and to improve the mounting quality.

[0009] In the electronic component mounting apparatus of the present invention, each of the mounting heads may be provided with a mounting nozzle which picks up and mounts the electronic component, and may move in the predetermined direction between a pickup position where the mounting nozzle picks up the electronic component and a mounting position where the mounting nozzle of the mounting head mounts the electronic component. The control unit may

cause each of the mounting heads to start to move simultaneously toward the same direction from each of the pickup positions and each of the mounting positions, and may cause each of the mounting heads to reach each of the mounting positions or each of the pickup positions simultaneously and stop simultaneously.

5 **[0010]** Because the control unit causes each mounting head to start to move simultaneously toward the same direction from the pickup position or the mounting position, and causes each mounting head to reach the mounting position or the pickup position simultaneously and stop simultaneously, it is possible to prevent the vibration caused by the movement of another mounting head from interfering during the pickup operation or the mounting operation of one mounting head
10 and affecting the mounting precision.

[0011] In the electronic component mounting apparatus of the present invention, the electronic component mounting apparatus includes a plurality of mounting stages for holding the substrate in which the electronic component is to be mounted on the upper surface or the substrate on which the another electronic component is mounted; and the distances between each of the pickup
15 positions and each of the mounting stages in the predetermined direction may be equal to each other respectively.

[0012] With this configuration, it is possible to make the distances between the pickup position and the mounting position the same, and it is possible to cause the plurality of mounting heads to start to move and stop simultaneously to improve the mounting quality.

20 **[0013]** In the electronic component mounting apparatus of the present invention, a plurality of the electronic components may be mounted on the substrate in the predetermined direction, and the control unit may cause each of the mounting heads to move to mount the plurality of electronic components in a manner that the distances between each of the pickup positions and each of the mounting positions becomes equal to each other respectively.

25 **[0014]** Thus, even when a plurality of electronic components are mounted on the substrate in

the predetermined direction, because it is possible to make the distances between the pickup positions and the mounting positions the same, it is possible to cause the plurality of mounting heads to start to move and stop simultaneously to improve the mounting quality.

[0015] In the electronic component mounting apparatus of the present invention, in a case that the distances between each of the pickup positions and each of the mounting positions are different, the moving speed of the mounting head in which the distance is shorter may be made to be slower than the moving speed of the mounting head in which the distance is longer.

[0016] Thus, even when the distances between the pickup positions and the mounting positions are different, it is possible to cause the plurality of mounting heads to start to move and stop simultaneously, and it is possible to improve the mounting quality.

[Effect]

[0017] The present invention can reduce the installation space and improve the mounting precision in the electronic component mounting apparatus including a plurality of mounting heads.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] FIG. 1 is a plan view showing the configuration of a bonding apparatus of an embodiment.

FIG. 2 is a plan view showing a picking operation of a semiconductor die performed by a pickup head of the bonding apparatus shown in FIG. 1.

FIG. 3 is a plan view showing a movement operation of an intermediate stage of the bonding apparatus shown in FIG. 1.

FIG. 4 is a plan view showing a movement of a mounting head of the bonding apparatus shown in FIG. 1 to a pickup position.

FIG. 5 is a plan view showing a movement of the mounting head of the bonding apparatus shown in FIG. 1 to a mounting position.

FIG. 6 is a plan view showing the movement of the mounting head to an initial position and to a first position of the intermediate stage after the semiconductor die is mounted on the substrate by the bonding apparatus shown in FIG. 1.

5 FIG. 7 is a graph showing the change in speed along with time of each mounting head when the distance between each pickup position and each mounting position is equal in the bonding apparatus shown in FIG. 1.

FIG. 8 is a graph showing the change in position in the Y direction along with time of each mounting head when the distance between each pickup position and each mounting position is equal in the bonding apparatus shown in FIG. 1.

10 FIG. 9 is a plan view showing the movement of the mounting head to the mounting position when the distances between each pickup position and each mounting position are different in the bonding apparatus shown in FIG. 1.

FIG. 10 is a plan view showing the movement of the mounting head to the initial position and to the first position of the intermediate stage after the semiconductor die is mounted on the substrate after the movement of the mounting head shown in FIG. 9.

FIG. 11 is a graph showing the change in speed along with time of each mounting head during the movement of the mounting head shown in FIG. 9.

FIG. 12 is a graph showing the change in position in the Y direction along with time of each mounting head during the movement of the mounting head shown in FIG. 9.

20 FIG. 13 is a plan view showing the configuration of a bonding apparatus of another embodiment.

FIG. 14 is a plan view showing the movement of a mounting head of the bonding apparatus shown in FIG. 13 to a pickup position.

FIG. 15 is a plan view showing the movement of the mounting head of the bonding apparatus shown in FIG. 13 to a mounting position.

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
5 100 mounts a semiconductor die 16 which is an electronic component on a substrate 15 or on another semiconductor die 16.

[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
10 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
15 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
20 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.

25 [0023] The intermediate stage 31 moves in the Y direction between a first position shown by a

solid line and a second position shown by a dot-chain line in FIG. 1. When the intermediate stage 31 comes to the second position shown by the dot-chain line, the Y-direction positions of the two placing tables 17 become pickup positions 13a and 13b. As described above, 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. Therefore, the distances ΔYc and ΔYd in the Y direction between each of the pickup positions 13a and 13b and each of the Y-direction positions 12c and 12d of the center of each of the mounting stages 12a and 12b are equal.

[0024] As shown in FIG. 1, when the semiconductor die 16 is mounted on the minus side end of each substrate 15 in the Y direction, the positions in the Y direction where the semiconductor die 16 is mounted become mounting positions 14a and 14b. In this case, the distance between the mounting positions 14a and 14b in the Y direction is W1, which is equal to the distance between the two placing tables 17 in the Y direction. In this case, the distances ΔYa and ΔYb in the Y direction between each of the pickup positions 13a and 13b and each of the mounting positions 14a and 14b become equal.

[0025] Each of the mounting heads 21a and 21b is attached to one side of the linear guide 20 side by side in the Y direction and is guided by the linear guide 20 to move in the Y direction. Mounting nozzles 22a and 22b which pick up and mount the semiconductor die 16 are attached to the mounting heads 21a and 21b. The mounting heads 21a and 21b move in the Y direction between the pickup positions 13a and 13b where the mounting nozzles 22a and 22b come directly above the placing table 17 to pick up the semiconductor die 16, and the mounting positions 14a and 14b where the mounting nozzles 22a and 22b mount the semiconductor die 16.

[0026] The pickup head 33 is provided with a pickup nozzle 34 which picks up the semiconductor die 16 from the wafer 35 and places the semiconductor die 16 on the placing table 17 of the intermediate stage 31.

[0027] A drive unit such as a linear motor is attached to each of the mounting heads 21a and

21b, the pickup head 33 and the intermediate stage 31, and each drive unit operates according to a command from the control unit 50. The control unit 50 is constituted by a computer which includes a CPU (central processing unit) and a storage unit inside.

[0028] Next, the operation of the bonding apparatus 100 is described with reference to FIG. 2 to FIG. 8. In the following description, as shown in FIG. 1, the case where the semiconductor die 16 is mounted on the minus side end of each substrate 15 in the Y direction is described.

[0029] As shown in FIG. 2, the control unit 50 causes each of the mounting heads 21a and 21b to move to an initial position and causes the intermediate stage 31 to move to the first position on the minus side in the Y direction. Then, the control unit 50 causes the pickup head 33 to move in the X direction, pick up the semiconductor dies 16 from the wafer 35 and place the semiconductor dies 16 respectively on the two placing tables 17 of the intermediate stage 31 by the pickup nozzle 34. The semiconductor dies 16 are placed on the two placing tables 17 of the intermediate stage 31 at an interval of the distance W1 in the Y direction.

[0030] When the placement of the semiconductor dies 16 is completed, the control unit 50 causes the intermediate stage 31 to move to the second position on the plus side in the Y direction, as shown in FIG. 3. When the intermediate stage 31 moves to the second position, the Y-direction position of each of the semiconductor dies 16 placed on each of the placing tables 17 becomes the pickup positions 13a and 13b, respectively.

[0031] As shown in FIG. 4, the control unit 50 causes each of the mounting heads 21a and 21b to move to the minus side in the Y direction so that the centers of each of the mounting nozzles 22a and 22b of each of the mounting heads 21a and 21b become the pickup positions 13a and 13b. At this time, the control unit 50 causes each of the mounting heads 21a and 21b to start to move simultaneously from the initial position toward the minus side in the Y direction, causes the centers of each of the mounting nozzles 22a and 22b to reach the pickup positions 13a and 13b simultaneously, and causes each of the mounting heads 21a and 21b to stop moving to the minus

side in the Y direction simultaneously.

[0032] As shown in FIG. 5, the control unit 50 sucks each of the semiconductor dies 16 at the front end of each of the mounting nozzles 22a and 22b of each of the mounting heads 21a and 21b to pick up the semiconductor dies 16 from the intermediate stage 31. When the pickup is completed, the control unit 50 causes each of the mounting heads 21a and 21b to move from the pickup positions 13a and 13b to the mounting positions 14a and 14b, as shown in FIG. 5. At this time, the control unit 50 causes each of the mounting heads 21a and 21b to start to move simultaneously toward the plus side in the Y direction, causes the center of each of the mounting nozzles 22a and 22b to reach the mounting positions 14a and 14b simultaneously, and causes each of the mounting heads 21a and 21b to stop moving to the plus side in the Y direction simultaneously.

[0033] As described above, because the distances ΔY_a and ΔY_b in the Y direction between each of the pickup positions 13a and 13b and each of the mounting positions 14a and 14b are equal, the control unit 50 causes each of the mounting heads 21a and 21b to start to move simultaneously at time t_0 , accelerate to the same speed with the same acceleration until time t_1 , move at the same speed in the Y direction until time t_2 , decelerate to zero speed with the same deceleration until time t_3 , and stop simultaneously at time t_3 , as shown by a broken line a and a solid line b shown in FIG. 7. At this time, as shown by a broken line c and a solid line d shown in FIG. 8, each of the mounting heads 21a and 21b reaches the mounting positions 14a and 14b simultaneously. The broken line a and the solid line b in FIG. 7 show the change in speed along with time of each of the mounting heads 21a and 21b, the broken line c and the solid line d in FIG. 8 show the change in Y-direction position along with time of each of the mounting heads 21a and 21b.

[0034] After the movement of each of the mounting heads 21a and 21b to the mounting positions 14a and 14b is completed and each of the mounting heads 21a and 21b is stopped, the control unit 50 causes each of the mounting nozzles 22a and 22b to descend and mounts, on each substrate 15,

the semiconductor die 16 which is sucked at the front end of each of the mounting nozzles 22a and 22b.

[0035] When the mounting of each semiconductor die 16 on each substrate 15 is completed, as shown in FIG. 6, the control unit 50 causes each of the mounting heads 21a and 21b to move to the initial position, causes the intermediate stage to move to the first position, and continues the pickup mounting operation of the next semiconductor die 16.

[0036] When a plurality of semiconductor dies 16 are mounted on the substrate 15 side by side in the Y direction, the control unit 50 causes each of the mounting heads 21a and 21b to move to mount the plurality of semiconductor dies 16 in a manner that the distances between each of the pickup positions 13a and 13b and each of the mounting positions 14a and 14b become equal. For example, as shown in FIG. 1, when the semiconductor die 16 is mounted on the minus side end of each substrate 15 in the Y direction, next, another semiconductor die 16 is mounted at a position which shifts from the initial mounting position with $\Delta Y1$ to the plus side in the Y direction. In this case, because the distance between each of the mounting positions 14a and 14b in the Y direction is $W1$, the distances between each of the pickup positions 13a and 13b and each of the mounting positions 14a and 14b are equal. As described above, by causing each of the mounting heads 21a and 21b to move in the Y direction with the same acceleration and at the same speed, it is possible to cause each of the mounting heads 21a and 21b to start to move simultaneously, reach the mounting positions 14a and 14b simultaneously, and stop simultaneously.

[0037] As described above, in the bonding apparatus 100 of the present embodiment, because the mounting heads 21a and 21b are arranged side by side on one side of the linear guide 20 in the Y direction, the space on the side of the linear guide 20 where the mounting heads 21a and 21b are not arranged can be used as an arrangement space for other machines. Therefore, it is possible to reduce the installation space. Further, because the control unit 50 causes each of the mounting heads 21a and 21b to start to move simultaneously toward the same direction from the

pickup positions 13a and 13b, reach the mounting positions 14a and 14b simultaneously and stop simultaneously, it is possible to prevent the vibration caused by the movement of the other mounting head 21b from interfering during the pickup operation or the mounting operation of one mounting head 21a and affecting the mounting precision, and the mounting precision can be improved.

[0038] Next, a case where the distances between each of the pickup positions 13a and 13b and each of the mounting positions 14a1 and 14b are different is described.

[0039] As shown in FIG. 9, when the semiconductor dies 16 are mounted on the minus side end in the Y direction of the substrate 15 on the minus side in the Y direction (front side), and on the plus side end in the Y direction of the substrate 15 on the plus side in the Y direction (back side), the distance W2 between the mounting position 14b on the front side and the mounting position 14a1 on the back side is larger than the distance W1 between the pickup position 13b on the front side and the pickup position 13a on the back side. In this case, the distance ΔY_{a1} between the pickup position 13a on the back side and the mounting position 14a1 on the back side is larger than the distance ΔY_b between the pickup position 13b on the front side and the mounting position 14b on the front side. In this case, the control unit 50 causes each of the mounting heads 21a and 21b to start to move simultaneously, causes each of the mounting nozzles 22a and 22b of each of the mounting heads 21a and 21b to reach each of the mounting positions 14a1 and 14b simultaneously, and causes each of the mounting heads 21a and 21b to stop moving in the Y direction simultaneously, by making the moving speed of the mounting head 21b which has a shorter moving distance slower than the moving speed of the mounting head 21a which has a longer moving distance.

[0040] As shown in FIG. 11, the control unit 50 controls the speed of each of the mounting heads 21a and 21b. A dot-chain line e and a solid line b in FIG. 11 show the change in speed along with time of each of the mounting heads 21a and 21b, and a dot-chain line f and a solid line

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 14a1 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

mounting heads 21a and 21b to start to move and stop simultaneously. It is possible to prevent the vibration caused by the movement of the other mounting head 21b from interfering during the pickup operation or the mounting operation of one mounting head 21a and affecting the mounting precision, and the mounting precision can be improved.

5 [0044] Next, a bonding apparatus 200 of another embodiment is described with reference to FIG. 13 to FIG. 15. The same parts as those of the bonding apparatus 100 described above with reference to FIG. 1 to FIG. 12 are designated by the same reference numerals and the description thereof is omitted.

[0045] As shown in FIG. 13, in the bonding apparatus 200, two linear guides 20 are arranged in
10 parallel in the Y direction, and two mounting heads 21a, 21b and 21c, 21d of each linear guide 20 are attached. The mounting heads 21a, 21b and 21c, 21d are arranged between the two linear guides 20 in a manner of facing each other. Therefore, the space on a side of the linear guide 20 where the mounting heads 21a, 21b are not arranged and the space on a side of the linear guide 20 where the mounting heads 21c, 21d are not arranged can be used as a space for other machines,
15 and the installation space can be further reduced as compared with the case where two bonding apparatuses 100 are arranged side by side.

[0046] In addition, the bonding apparatus 200 is provided with two guide rails 30 and two intermediate stages 31 guided by each of the guide rails 30 respectively. Furthermore, two pickup heads 33 are attached to two guide frames 32 which extend in the X direction.

20 [0047] The operation of the bonding apparatus 200 configured as above is described.

[0048] The control unit 50 causes the two pickup heads 33 to move in the X direction to place one semiconductor die 16 on each placing table 17 of each intermediate stage 31 from two wafers 35, and a total of four semiconductor dies 16 are placed.

[0049] As described with reference to FIG. 4, the control unit 50 causes each of the mounting
25 heads 21a, 21b, 21c and 21d to move to the minus side in the Y direction so that the centers of

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 and 21b to the mounting positions 14a and 14b is completed and each of the mounting heads 21a and 21b is stopped, the control unit 50 causes each of the mounting nozzles 22a and 22b to descend and mounts the semiconductor dies 16 sucked at the front end of each of the mounting nozzles 22a and 22b 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]

10	[0054] 10	base
	11a, 11b	transfer rail
	12a, 12b	mounting stage
	12c, 12d	Y-direction position
	13a, 13b	pickup position
	14a, 14a1, 14b	mounting position
	15	substrate
	16	semiconductor die
	17	placing table
	20	linear guide
15	21a, 21b, 21c, 21d	mounting head
	22a, 22b, 22c, 22d	mounting nozzle
	30	guide rail
	31	intermediate stage
	32	guide frame
20	33	pickup head
	34	pickup nozzle
	35	wafer
	50	control unit
	100, 2000	bonding apparatus

WHAT IS CLAIMED IS:

1. An electronic component mounting apparatus, which mounts an electronic component on a substrate or another electronic component, comprising:

a linear guide, configured to extend in a predetermined direction;

5 a plurality of mounting heads, arranged side by side in the predetermined direction and are guided by the linear guide to move in the predetermined direction; and

a control unit, configured to adjust positions of the mounting heads in the predetermined direction;

wherein the control unit is configured to cause each of the mounting heads to start to
10 move simultaneously toward a same direction, and cause each of the mounting heads to stop simultaneously.

2. The electronic component mounting apparatus according to claim 1,

wherein each of the mounting heads is provided with a mounting nozzle which picks up and mounts the electronic component, and moves in the predetermined direction between a
15 pickup position where the mounting nozzle picks up the electronic component and a mounting position where the mounting nozzle of the mounting head mounts the electronic component; and

wherein the control unit is configured to

cause each of the mounting heads to start to move simultaneously toward the same direction from each of the pickup positions or each of the mounting positions, and cause each of
20 the mounting heads to reach each of the mounting positions or each of the pickup positions simultaneously and stop simultaneously.

3. The electronic component mounting apparatus according to claim 2, further comprising

a plurality of mounting stages for holding the substrate in which the electronic
25 component is to be mounted on an upper surface or the substrate on which the another electronic

component is mounted; and

wherein distances between each of the pickup positions and each of the mounting stages in the predetermined direction are equal to each other respectively.

4. The electronic component mounting apparatus according to claim 3,

5 wherein a plurality of the electronic components are mounted on the substrate in the predetermined direction; and

wherein the control unit is configured to

cause each of the mounting heads to move to mount the plurality of electronic components in a manner that the distances between each of the pickup positions and each of the mounting positions becomes equal to each other respectively.

5. The electronic component mounting apparatus according to claim 2 or 3, wherein

in a case that distances between each of the pickup positions and each of the mounting positions are different,

the control unit is configured that a moving speed of the mounting head in which the distance is shorter is made slower than a moving speed of the mounting head in which the distance is longer.