

Claims

I claim:

1. A component placement machine comprising:
a movable housing that is adapted for movement in an X and a Y axis above a printed circuit board, the housing comprising:
a rotatable frame having at least one pick and place head configured to pick up a component and place the component on the printed circuit board; and
a fluid application station configured to apply fluid to the component after being picked up by the pick and place head and before being placed on the printed circuit board.
2. The component placement machine of claim 1, wherein the fluid application station includes a housing configured to retain a pool of fluid.
3. The component placement machine of claim 2, wherein the fluid application station includes a belt that is housed within the housing on a plurality of rollers, the belt being partially located in the pool of fluid and wherein the belt is configured to apply fluid to the component.
4. The component placement machine of claim 3, wherein fluid application station includes a motor and axle that are configured to rotate at least one of the plurality of rollers to rotate the belt.
5. The component placement machine of claim 3, wherein the fluid application station further includes a wiper that is configured to remove the fluid from an inner surface of the belt and a doctor blade configured to level the fluid on an outer surface of the belt that is configured to apply the fluid to the component.
6. The component placement machine of claim 1, wherein the fluid application station is removably attached to the housing.
7. The component placement machine of claim 1, wherein the rotatable frame includes a plurality of pick and place heads.

8. The component placement machine of claim 7, wherein fluid is applied by the fluid application station to a first component picked up by a first pick and place head while a separate pick and place head is picking an additional component.

9. A method for applying a fluid to a component during a placement cycle, the method comprising:

- (a) providing a component placement machine including a housing adapted for movement along an X and a Y axis above a printed circuit board and having a frame attached thereto, the frame having a pick and place head disposed thereupon;
- (b) providing a fluid application station contiguous with the housing and adapted to apply fluid to the component;
- (c) moving the housing to a pick location;
- (d) picking the component from a supply of components using the pick and place head;
- (e) moving the housing to a predetermined location;
- (f) applying fluid to the picked component; and
- (g) placing the picked component with the fluid applied onto the printed circuit board at said predetermined location.

10. The method of claim 9, wherein said fluid application step (f) is accomplished substantially completely during at least one of said moving step (e), and said placing step (g).

11. The method of claim 9, further comprising rotating a belt of the fluid application station, wherein the belt is configured to apply the fluid to the picked component in step (f).

12. The method of claim 9, further comprising removing the fluid application station from the housing for easier access to the fluid application station and reattaching the fluid application station to the housing.

13. The method of claim 9, further comprising:
determining if fluid needs to be applied the picked component; and
performing step (g) only for those picked components determined to require the application of fluid.

14. The method of claim 9, further comprising:
providing a plurality of pick and place heads on the frame; and
repeating at least steps (d) , (e) and (g) for an additional component.
15. A method for applying a fluid to a component during a placement cycle, the method comprising:
(a) providing a component placement machine including a housing adapted for movement along an X and a Y axis above a printed circuit board and having a frame rotatably attached thereto, said frame having a plurality of pick and place heads disposed thereupon;
(b) providing a fluid application station attached to the housing and adapted to apply fluid to the component;
(c) picking the component from a supply of components using at least one of the plurality of pick and place heads;
(d) applying fluid to the picked component; and
(e) placing the picked component with the fluid applied onto the printed circuit board at a predetermined location.
16. The method of claim 15, further comprising repeating steps (c) to (e) for an additional component, wherein said fluid application step (d) is accomplished substantially during at least one of said repeated picking step (c) of the additional component.
17. The method of claim 16, wherein said placing step (e) is accomplished substantially during the repeated fluid application step (d) for the additional component.
18. The method of claim 15, wherein said fluid application step (d) comprises means for extending at least one of a plurality of the pick and place heads such that the fluid is applied to the component by the fluid application station.
19. The method of claim 15, further comprising determining whether fluid needs to be applied to the picked component and performing step (g) only for those picked components determined to require the application of fluid.

20. The method of claim 15, further comprising removing the fluid application station from the housing for easier access to the fluid application station and reattaching the fluid application station to the housing.

Claims:

1. A component placement machine comprising:
a movable housing that is adapted for movement in an X and a Y axis above a printed circuit board, the housing comprising:
a rotatable frame having at least one pick and place head configured to pick up a component and place the component on the printed circuit board; and
a fluid application station contiguous with the housing and configured to apply fluid to the component after being picked up by the pick and place head and before being placed on the printed circuit board when the movable housing is at least one of:
moving to a predetermined placement location; and
placing the component at the predetermined placement location.
2. The component placement machine of claim 1, wherein the fluid application station includes a housing configured to retain a pool of fluid.
3. The component placement machine of claim 2, wherein the fluid application station includes a belt that is housed within the housing on a plurality of rollers, the belt being partially located in the pool of fluid and wherein the belt is configured to apply fluid to the component.
4. The component placement machine of claim 3, wherein fluid application station includes a motor and axle that are configured to rotate at least one of the plurality of rollers to rotate the belt.

5. The component placement machine of claim 3, wherein the fluid application station further includes a wiper that is configured to remove the fluid from an inner surface of the belt and a doctor blade configured to level the fluid on an outer surface of the belt that is configured to apply the fluid to the component.
6. The component placement machine of claim 1, wherein the fluid application station is removably attached to the housing.
7. The component placement machine of claim 1, wherein the rotatable frame includes a plurality of pick and place heads.
8. The component placement machine of claim 7, wherein fluid is applied by the fluid application station to a first component picked up by a first pick and place head while a separate pick and place head is picking an additional component.
9. A method for applying a fluid to a component during a placement cycle, the method comprising:
 - (a) providing a component placement machine including a housing, the housing adapted for movement along an X and a Y axis above a printed circuit board, the housing having a frame attached thereto, the frame having a pick and place head disposed thereupon;
 - (b) providing a fluid application station contiguous with the housing and adapted to apply fluid to the component;
 - (c) moving the housing to a pick location;
 - (d) picking the component from a supply of components using the pick and place head;

(e) moving the housing to a predetermined location;

(f) applying fluid to the picked component; and

(g) placing the picked component with the fluid applied onto the printed circuit board

at said predetermined location;

wherein said fluid application step (f) is accomplished at least substantially during at least one of said moving step (e), and said placing step (g).

10. The method of claim 9, further comprising rotating a belt of the fluid application station, wherein the belt is configured to apply the fluid to the picked component in step (f).

11. The method of claim 9, further comprising removing the fluid application station from the housing for easier access to the fluid application station and reattaching the fluid application station to the housing.

12. The method of claim 9, further comprising:
determining if fluid needs to be applied the picked component; and
performing step (g) only for those picked components determined to require the application of fluid.

13. The method of claim 9, further comprising:
providing a plurality of pick and place heads on the frame; and
repeating at least steps (d) , (e) and (g) for an additional component.

14. A method for applying a fluid to a component during a placement cycle, the method comprising:

(a) providing a component placement machine including a housing, the housing adapted for movement along an X and a Y axis above a printed circuit board, the housing and having a frame rotatably attached thereto, said frame having a plurality of pick and place heads disposed thereupon;

(b) providing a fluid application station attached to the housing and adapted to apply fluid to the component;

(c) picking the component from a supply of components using at least one of the plurality of pick and place heads;

(d) applying fluid to the picked component;

(e) moving the housing to a predetermined location; and

(f) placing the picked component with the fluid applied onto the printed circuit board at a the predetermined location;

further comprising repeating steps (c) to (e) for an additional component, wherein said fluid application step (d) is accomplished at least substantially during at least one of said repeated picking step (c) of the additional component.

15. The method of claim 14, wherein said placing step (e) is accomplished substantially during the repeated fluid application step (d) for the additional component.

16. The method of claim 14, wherein said fluid application step (d) comprises means for extending at least one of a plurality of the pick and place heads such that the fluid is applied to the component by the fluid application station.

17. The method of claim 14, further comprising determining whether fluid needs to be applied to the picked component and performing step (g) only for those picked components determined to require the application of fluid.

18. The method of claim 14, further comprising removing the fluid application station from the housing for easier access to the fluid application station and reattaching the fluid application station to the housing.