Claims

I Claim:

1. An assembly machine comprising:

A circuitous track;

a dispensing head configured to at least partially assemble an unfinished product; and

a permanent magnet linear motor system located within the dispensing head and the track, wherein the permanent magnet linear motor system is configured to provide attachment of the dispensing head to the circuitous track and configured to provide motion of the dispensing head along the circuitous track, wherein the dispensing head is attached to the circuitous track by a magnetic attraction between an element of the dispensing head and an element of the circuitous track.

2. The assembly machine of claim 1, wherein the dispensing head includes a first iron core coil unit of the permanent magnet linear motor system and wherein the track includes a plurality of permanent magnets of the permanent magnet linear motor system.

3. The assembly machine of claim 1, further comprising a plurality of dispensing heads, and wherein the permanent magnet linear motor system is programmable to independently drive the plurality of dispensing heads on the track.

4. The assembly machine of claim 1, wherein at least one of bearings and cam rollers are located between the dispensing head and the track to facilitate movement of the dispensing head with respect to the track.

5. The assembly machine of claim 1, wherein the assembly machine is a pick-and-place machine for assembling printed circuit boards, and wherein the dispensing head is a pick-and-place head and includes a pick-and-place nozzle.

6. The assembly machine of claim 1, wherein the continuous circuitous track includes an air distribution system configured to distribute air to the dispensing head while the dispensing head is moving or stationary.

7. The assembly machine of claim 1, wherein the dispensing head includes a moving permanent magnet and wherein the track includes a plurality of stationary iron core coils.

8. The assembly machine of claim 1, wherein the track is configured to provide power to the dispensing head.

9. An assembly method comprising:

providing a dispensing head;

providing a circuitous track;

providing a permanent magnet linear motor system located within the dispensing head and the track;

magnetically attaching the dispensing head to the track, wherein the dispensing head is attached to the track by a magnetic attraction between an element of the dispensing head and an element of the track;

magnetically moving the dispensing head along the track; and

at least partially assembling, with the dispensing head, an unfinished product.

10. The assembly method of claim 9, wherein the dispensing head includes a first iron core coil unit of the permanent magnet linear motor system and wherein the track includes a plurality of permanent magnets of the permanent magnet linear motor system.

11. The assembly method of claim 9, further comprising providing a plurality of dispensing heads, and further comprising independently driving the plurality of dispensing heads on the track with the permanent magnet linear motor system.

12. The assembly method of claim 9, further comprising facilitating movement of the dispensing head with respect to the track with at least one of bearings and cam rollers that are located between the dispensing head and the track.

13. The assembly method of claim 9, further comprising providing a pick and place machine for assembling printed circuit boards wherein the dispensing head and circuitous track are components of the pick and place machine, and wherein the dispensing head is a pick and place head and includes a pick and place nozzle.

14. The assembly method of claim 9, further comprising distributing air to the dispensing head through the track while the dispensing head is moving or stationary.

15. The assembly method of claim 9, wherein the dispensing head includes a moving permanent magnet and wherein the track includes a plurality of stationary iron core coils.

16. The assembly method of claim 9, further comprising providing power to the dispensing head through the track.