CLAIMS

1. A device (1) for conveying and flipping a component (10) for use in conjunction with a rotary turret module (30), the device (1) includes

at least a pair of spaced apart flipping arms (100, 300), a first flipping arm (100) and a second flipping arm (300), mounted on a platform (500); wherein each of the flipping arms (100, 300) is provided with one nozzle, a first nozzle (110) associated with the first flipping arm (100) and a second nozzle (310) associated with the second flipping arm (300), each having one end (111, 311) configured to pick the component (10) and another end (113, 311) fixedly mounted on a shaft (130, 330) with a longitudinal axis of the nozzle (110, 310) substantially orthogonal to a longitudinal axis of the shaft (130, 330); the shaft (130, 330) being supported on the flipping arm (100, 300) and operatively connected to a rotary actuating means (150, 350); wherein the rotary actuating means (150, 350) is adapted to be capable of effecting a rotational motion of the shaft (130, 330) about the longitudinal axis of the shaft (130, 330) and hence the nozzles (110, 310) by substantially 90 degrees,

wherein the nozzles (110, 310) are caused to rotate in a counter direction so as to position the ends (111, 311) of the nozzles (110, 310) configured to pick the component (10) to face each other;

a pneumatic means (not shown) for controlling the pressure at the nozzles (110, 310) to enable the nozzles (110, 310) either to hold or to release the component (10); and

a linear actuating means (400) mounted on the platform (500) and operatively connected to at least one of the flipping arms (100, 300 or 100

and 300), the linear actuating means (400) being adapted to be capable of moving at least one of the flipping arms (100, 300 or 100 and 300) in a horizontal direction to bring the nozzles (110, 310) towards or apart from one another.

2. The device (1) for conveying and flipping a component (10) according to claim 1, wherein the two flipping arms (100 and 300) are preferably positioned adjacent to one another.

3. The device (1) for conveying and flipping a component (10) according to claim 1, wherein the first flipping arm (100) is moving horizontally towards or apart from the second flipping arm (300).

4. The device (1) for conveying and flipping a component (10) according to claim 1, wherein the second flipping arm (300) is moving horizontally towards or apart from the first flipping arm (100).

5. The device (1) for conveying and flipping a component (10) according to claim 1, wherein the first and second flipping arms (100 and 300) are moving horizontally towards or apart from each other.

6. The device (1) for conveying and flipping a component (10) according to claim 1, wherein the linear actuating means (400) is provided with a sensor and/or an encoder (not shown).

7. The device (1) for conveying and flipping a component (10) according to claim 6, wherein the sensor and/or the encoder (not shown) determines the distance travelled by the moving flipping arm (100, 300) or arms (100 and 300) so as to bring the ends (111, 311) of the nozzles (110, 310) configured to pick the component (10) to close proximity to each other to effect transfer of the component (10) from the first nozzle (110) to the second nozzle (310).

8. A method for conveying and flipping a component (10) for use in conjunction with a rotary turret module (30) according to the device (1) for conveying and flipping a component (10) comprising the steps of

a. connecting a first nozzle (110) associated with a first flipping arm (100) with a source of negative pressure;
b. picking a component (100) with the first nozzle (110);
c. rotating the first nozzle (110) and a second nozzle (330) associated with a second flipping arm (300) by substantially 90 degrees in a counter direction so as to position the nozzles (110 and 310) to face each other;
d. moving at least one of the flipping arms (100, 300 or 100 and 300) in a horizontal direction, thereby bringing the nozzles (110 and 310) to close proximity to each other;
e. connecting the negative pressure to the second nozzle (310);
f. neutralising the negative pressure at the first nozzle (110), thereby transferring the component (10) from the first nozzle (110) to the second nozzle (310);

g. moving the flipping arms (100 and 300) apart in the horizontal direction;

h. moving the first and second nozzles (110 and 310) to a vertically upward position, thereby flipping the component (10) 180 degrees; and

i. repeating steps a to h for picking and flipping a second component.

9. The method for conveying and flipping a component (10) according to claim 8, wherein the first nozzle (110) is preferably picked the component (10) from a pick-up head (31) of the rotary turret module (30) in step b.

10. The method for conveying and flipping a component (10) according to claim 8, wherein the 180 degrees flipped component (10) in step h is preferably picked by the pick-up head (31) of the rotary turret module (30).

11. The method for conveying and flipping a component (10) according to claim 8, wherein the nozzle (110, 310) having one end (111, 311) configured to pick the component (10) and another end (113, 313) fixedly mounted on a shaft (130, 330) supported on the flipping arm (100, 300).

12. The method for conveying and flipping a component (10) according to claim 11, wherein the shaft (130, 330) is operatively connected to a rotary actuating means (150, 350).

13. The method for conveying and flipping a component (10) according to claim 12, wherein the rotary actuating means (150, 350) is adapted to be capable of effecting a rotational motion of the shaft (113, 313) and hence the nozzles (110, 310) in a counter direction so as to position the ends (111, 311) of the nozzles (110, 310) configured to pick the component (10) to face each other.

14. The method for conveying and flipping a component (10) according to claim 8, wherein the pressure of the nozzles (110, 310) in steps a, e and f is controlled by a pneumatic means (not shown).

15. The method for conveying and flipping a component (10) according to claim 8, wherein the horizontal motion of the flipping arms (100, 300) in steps d and g are effected by a linear actuating means (400) operatively connected to at least one of the flipping arms (100, 300 or 100 and 300).

16. The method for conveying and flipping a component (10) according to claim 8 or 15, wherein the first flipping arm (100) is moving horizontally towards or apart from the second flipping arm (300).

17. The method for conveying and flipping a component (10) according to claim 8 or 15, wherein the second flipping arm (300) is moving horizontally towards or apart from the first flipping arm (100).

18. The method for conveying and flipping a component (10) according to claim 8 or 15, wherein the first and second flipping arms (100 and 300) are moving horizontally towards or apart from each other.

19. The method for conveying and flipping a component (10) according to claim 8 or 15, wherein the distance travelled by the moving flipping arm (100, 300) or arms (100 and 300) is determined by a sensor and/or an encoder (not shown).