CLAIMS

1. An automated tray return system comprising

a tray receptacle having an entrance to receive a tray;

a motor coupled to the tray receptacle, wherein during operation, the motor rotates the tray receptacle to clear content from the tray, followed by a further rotation to eject the tray from the entrance;

a sorter arrangement resting on an incline and positioned to catch the content from the tray, the sorter arrangement having openings sized to allow some of the content to pass but prevent others from passing; and

a bin assembly to receive the tray from the tray receptacle and the sorted content from the sorter arrangement,

wherein the tray receptacle comprises at least two compartments, where one aligns the tray into a longitudinal orientation and the other into a horizontal orientation, the selected compartment depending on an angle at which the tray is received into the tray receptacle, the longitudinal orientation being where a breadth of the tray faces the entrance of the tray receptacle and the horizontal orientation being where a length of the tray faces the entrance of the tray receptacle.

2. The automated tray return system of claim 1, wherein a speed at which the motor rotates the tray receptacle is adjustable.

3. The automated tray return system of claim 1 or 2,

wherein the compartment that aligns the tray into the longitudinal orientation comprises a sloping section beginning with a width that is less than the length of the tray, the beginning of the sloping section being disposed at the entrance; and

wherein the compartment that aligns the tray into the horizontal orientation comprises a pair of sections which are flat relative to the sloping section, the flat sections beginning apart by a distance which is more than the breadth of the tray, and the beginning of the flat sections being disposed at the entrance.

4. The automated tray return system of claim 3, wherein each of the flat sections extend from opposite side edges of the sloping section, wherein the tray receptacle further comprises

opposing side walls, each disposed along a corresponding flat section; and

a ridge extending from each of the opposing side walls to be over at least a portion of a corresponding flat section; and

a mechanical stop disposed at an end of each of the sloping section and the flat sections.

5. The automated tray return system of claim 4,

wherein the mechanical stop at the end of the sloping section comprises

a pair of protruding brackets, each bracket being coupled at one end to the sloping section and at another end to a corresponding ridge; and

wherein the mechanical stop at the end of the flat sections comprises

a pair of bars, each bar being coupled at one end to one of the flat sections and at another end to the corresponding ridge.

6. The automated tray return system of claim 3, wherein the flat sections extend over at least a portion of a base with the sloped section, wherein the tray receptacle further comprises

opposing side walls, each disposed along a corresponding flat section;

a ridge extending from each of the opposing side walls to be over at least a portion of the corresponding flat section; and

a mechanical stop disposed at an end of each of the base and the flat sections.

7. The automated tray return system of claim 6,

wherein the mechanical stop at the end of the base comprises

a pair of bars, each bar being coupled at one end to the base and at another end to a corresponding flat portion; and

wherein the mechanical stop at the end of the flat sections comprises

a pair of bars, each bar coupled at one end to one of the flat sections and at another end to the corresponding ridge.

8. The automated tray return system of any of the preceding claims, wherein the motor is coupled to a pair of the tray receptacles through a connector to which the tray receptacles are rigidly coupled, wherein during operation, only one of the tray receptacles is configured to have an inserted tray.

9. The automated tray return system of claim 8, wherein the pair of the tray receptacles rotates in a same direction when clearing the content on the tray and ejecting the tray, the motor being stopped when the tray is ejected.

10. The automated tray return system of claim 8 or 9, wherein following ejection of its tray from one of the tray receptacles, the other tray receptacle is in an alignment to receive a new tray.

11. The automated tray return system of any one of the claims 8 to 10, wherein the sorter arrangement is located below the pair of the tray receptacles.

12. The automated tray return system of any one of the claims 1 to 7, wherein the motor reverses a rotation direction of the tray receptacle, after clearing the content on the tray, to eject the tray.

13. The automated tray return system of claim 12, wherein the sorter arrangement is located forward of the tray receptacle, wherein during operation, the motor rotates the tray receptacle with sufficient speed to fling the content on the tray towards the sorter arrangement.

14. The automated tray return system of any one of the preceding claims, further comprising a water jet disposed proximate to the sorter arrangement, the water jet operable to clean the sorter arrangement and moisten the sorted content in the bin assembly.

15. The automated tray return system of any one of the preceding claims, further comprising an inclined waste catchment surface,

wherein the sorter arrangement comprises:

a crockery sorter having openings sized to allow food waste and cutlery to pass but prevent crockery from passing; and

a cutlery sorter disposed between the crockery sorter and the inclined water waste catchment surface, the cutlery sorter having slits that run substantially transverse to the openings in the crockery sorter, the slits preventing cutlery from passing but allowing food waste to pass and land on the inclined waste catchment surface.

16. The automated tray return system of claim 15, wherein the sorter arrangement is pivotally connected to a housing providing the inclined waster catchment surface.

17. The automated tray return system of claim 15 or 16, wherein the bin assembly comprises

one or more bins for storing the tray after ejection from the tray receptacle, the crockery from the crockery sorter and the cutlery from the cutlery sorter;

a plurality of sieves disposed in one or more of the bins, each for catching the cutlery or the food waste and positioned downstream of the cutlery sorter or the inclined waste catchment surface respectively.

18. The automated tray return system of claim 17, wherein the tray storage bin comprises

a plate to receive the tray from the tray receptacle; and

at least one spring biasing the plate towards an opening of the tray storage bin.

19. The automated tray return system of any one of the claims 16 to 18, wherein the housing and the bin assembly rest on rollers to facilitate removal.

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20. The automated tray return system of any of the preceding claims, further comprising a conveying surface from which the tray receptacle receives the tray wherein the conveying surface comprises protruding strips to provide traction to a tray placed onto the conveying surface.