Claims

1. A ~~M~~method of fulfilling orders comprising:

- storing~~age of~~ items needed to fulfill orders from a queue of a plurality of orders in an automated storage facility and storing~~age of~~ items of the same kind in receptacles containing several same items~~;~~
- ~~,~~ wherein the automated storage facility comprises aisles and a three dimensional racking for storage of receptacles ~~with automatic storage and retrieval devices, preferably shuttles, servicing each aisle and possibly each level,~~;
- ~~when all of the items to complete an order are available or stored in the automated storage facility,~~ retrieving~~al~~ and transporting of the receptacles containing items for fulfillment of ~~said~~a certain order to one of a plurality of picking stations of the automated storage facility via automatic storage and retrieval shuttles for specific item retrieval for fulfilling said certain order when all of the items to complete said certain order are available or stored in the automated storage facility;
- packing retrieved items with other retrieved items of an order at said picking station for order fulfillment~~,~~;
- wherein each aisle is directly connected to one of said plurality of picking stations and receptacles containing items for orders to be fulfilled at such connected picking station are stored within the connected aisle;
- ~~wherein~~checking according to predetermined criteria at the time of retrieval of ~~the~~ a specific receptacle containing an item for said~~the~~ certain order ~~it is checked according to predetermined criteria~~ whether the same item is needed for fulfillment of one or more subsequent orders at one or more different picking stations and, if this is the case, placing one or more of the same items from the specific receptacle into one or more separate receptacles for dedicated storage in different aisles of said automated storage facility according to the different picking station assignment for said one or more subsequent orders, with the total number of the same items needed for said one or more subsequent orders associated with a particular one of the different picking stations being placed into a selected one of the separate receptacles~~further orders and if this is the case items from the receptacle are placed into separate receptacles for dedicated storage in different aisles according to picking station assignment for said further orders~~.

~~2. Method as claimed in claim 1, wherein the predetermined criteria for checking comprises one or a combination of~~

~~a) whether the same item is needed for fulfillment of further orders from the queue at the given point in time;~~

~~b) whether the same item is needed for fulfillment of further orders from the queue at the given point in time within a predetermined time window;~~

~~c) whether the same item is predicted to be needed for fulfillment of further orders based upon past order history within a predetermined time window;~~

~~3. Method as claimed in claim 1 or 2, wherein total number of items needed for orders associated with an aisle or certain picking station are placed into a receptacle.~~

~~4. Method as claimed in claim 1 or 2, wherein total number of items needed for orders of neighboring aisles or neighboring picking stations are placed into a receptacle.~~

~~5. Method as claimed in claim 1 or 2, wherein the number of items for each further order are placed into a dedicated separate receptacle for each further order.~~

~~6. Method as claimed in claim 1 or 2, wherein one item for a further order is placed in each receptacle.~~

~~7. Method as claimed in a preceding claim, wherein separation of items is performed at a dedicated separation station or at said picking station.~~

~~8. Method as claimed in a preceding claim, wherein the automatic storage and retrieval devices, preferably shuttles, themselves have load handling means which allow transfer of receptacles directly between adjoining racks by pushing or pulling the receptacles from a source rack location of a first rack to a destination rack location of an adjoining second rack.~~

2. The method as claimed in claim 1, wherein the total number of same items needed for more than one subsequent order associated with the particular different picking station are placed into the selected one of the separate receptacles.

3. The method as claimed in claim 1, wherein the checking according to predetermined criteria is performed by a control system of the automated storage facility.

4. The method as claimed in claim 1, wherein the number of same items needed for one subsequent order associated with the particular different picking station are placed into the selected one of the separate receptacles.

5. The method as claimed in claim 1, wherein one same item for a subsequent order is placed in the selected one of the separate receptacles.

6. The method as claimed in claim 1, wherein separation of items is performed at a dedicated separation station or at said picking station.

7. The method as claimed in claim 1, further comprising transferring of receptacles directly between adjoining racks by pushing or pulling the receptacles from a source rack location of a first rack to a destination rack location of an adjoining second rack via the automatic storage and retrieval shuttles.

8. The method as claimed in claim 1, wherein the racking of the automated storage facility comprises multiple levels, and wherein the automatic storage and retrieval shuttles service each aisle and each level.

9. The method as claimed in claim 1, wherein the predetermined criteria for the checking according to predetermined criteria comprises one or a combination of
a) whether the same item is needed for fulfillment of subsequent orders from the queue at the given point in time;
b) whether the same item is needed for fulfillment of subsequent orders from the queue at the given point in time within a predetermined time window;
c) whether the same item is predicted to be needed for fulfillment of subsequent orders based upon past order history within a predetermined time window.

10. The method as claimed in claim 9, wherein the total number of same items needed for more than one subsequent order associated with the particular different picking station are placed into the selected one of the separate receptacles.

11. The method as claimed in claim 9, wherein the number of same items needed for one subsequent order associated with the particular picking station are placed into the selected one of the separate receptacles.

12. The method as claimed in claim 9, wherein one same item for a subsequent order is placed in the selected one of the separate receptacles.

13. A method of fulfilling orders comprising:

storing items needed to fulfill orders from a queue of a plurality of orders in an automated storage facility and storing items of the same kind in receptacles containing several same items, wherein the automated storage facility comprises aisles and a three dimensional racking for storage of receptacles, and wherein each aisle is directly connected to one of a plurality of picking stations and receptacles containing items for orders to be fulfilled at such connected picking station are stored within the connected aisle;

retrieving and transporting of the receptacles containing items for fulfillment of a certain order to the associated connected picking station of the automated storage facility connected for specific item retrieval for fulfilling said certain order when all of the items to complete an order are available or stored in the automated storage facility;

checking according to predetermined criteria at the time of retrieving each specific receptacle containing an item for the certain order whether the same item is needed for fulfillment of subsequent orders at one or more different picking stations and, if the same item is needed for fulfillment of subsequent orders at a different picking station, placing one or more of the same items from the specific receptacle into one or more separate receptacles for dedicated storage in different aisles of said automated storage facility according to the picking station assignment for said subsequent orders at different picking stations; and

packing retrieved items with other retrieved items of an order at said picking station for order fulfillment.

14. The method as claimed in claim 13, wherein said retrieving and transporting of the receptacles containing items for fulfillment of said certain order is done via automatic storage and retrieval shuttles.

15. The method as claimed in claim 13, wherein the predetermined criteria for said checking at the time of retrieving each specific receptacle comprises one or a combination of

a) whether the same item is needed for fulfillment of subsequent orders from the queue at the given point in time;

b) whether the same item is needed for fulfillment of subsequent orders from the queue at the given point in time within a predetermined time window;

c) whether the same item is predicted to be needed for fulfillment of subsequent orders based upon past order history within a predetermined time window.

16. The method as claimed in claim 13, wherein the total number of same items needed for subsequent orders associated with an aisle or certain picking station are placed into one selected separate receptacle.

17. The method as claimed in claim 13, wherein the total number of same items needed for subsequent orders of neighboring aisles or neighboring picking stations are placed into one selected separate receptacle.

18. The method as claimed in claim 13, wherein the number of same items for each subsequent order are placed into a dedicated selected separate receptacle for each subsequent order.

19. The method as claimed in claim 13, wherein one same item for a subsequent order is placed in each separate receptacle.