Claims

1. A material-handling system, comprising:

a first processing station having a first article input and a first article output;

a transfer system between at least said first article input and said first article output, said transfer system comprising a track, a plurality of transfer units travelling along said track and a propulsion system driving said transfer units reciprocatingly along said track in a regular motion between opposite ends of said track past said input and output, each of said transfer units having a bidirectional conveying surface that is oriented perpendicular to said track thereby providing an article support surface that is configured to support articles and to transfer articles to and from that article support surface transversely of said track; and

a control, said control controlling said bidirectional conveying surfaces of said transfer units and said first article input and said first article output to selectively receive an article from said first article output to one of said bidirectional conveying surfaces as that conveying surface travels past said first article output and to discharge an article from one of said bidirectional conveying surfaces to said first article input as that transfer unit travels past said first article input in order to sequence articles between said first article input and said first article output.

2. The material-handling system as claimed in claim 1 wherein said transfer units comprise cross belt units defining said bidirectional conveying surfaces.

3. The material-handling system as claimed in claim 2 wherein said bidirectional conveying surfaces are each defined by an endless belt that is driven by a motorized roller.

4. The material-handling system as claimed in claim 3 wherein said endless belt has a low modulus of elasticity.

5. The material-handling system as claimed in claim 1 wherein said first processing

station comprises a three-dimensional warehouse having stacked racks, an elevator that is adapted to store articles to levels of the racks and retrieves articles from the levels of the racks and a plurality of shuttles that transfer articles between the elevator and the racks, wherein said first article input supplies articles to said elevator and said first article output discharges articles from said elevator.

6. The material-handling system as claimed in claim 1 wherein said transfer units travel in unison in a continuous motion between opposite ends of said track.

7. The material-handling system as claimed in claim 6 wherein said transfer units are interconnected in a train.

8. The material-handling system as claimed in claim 6 including a propulsion system to move said transfer units in said regular motion, said propulsion system comprising a servo motor.

9. The material-handling system as claimed in claim 8 wherein said servo motor travels with said transfer units.

10. The material-handling system as claimed in claim 8 wherein said servo motor is stationary.

11. A material-handling system, comprising:

a first processing station having a first article input and a first article output;

a second processing station having a second article input and a second article output;

a transfer system between at least said first article input and said first article output and said second article input and said second article output, said transfer system comprising a track, a plurality of transfer units travelling along said track and a propulsion system driving said transfer units reciprocatingly along said track in a regular motion between opposite ends of said track past said first article input, said first article

output, said second article input and said second article input, each of said transfer units having a bidirectional conveying surface that is oriented perpendicular to said track thereby providing an article support surface that is configured to support articles and to transfer articles to and from that article support surface transversely of said track; and

a control, said control controlling said bidirectional conveying surfaces of said transfer units and said first article input, said first article output, said second article input and said second article output to selectively receive articles from said first article output or said second article output to one of said bidirectional conveying surfaces as that conveying surfaces travels past said first article output or said second article output and to discharge articles from one of said bidirectional conveying surfaces to said first article input or said second article input as that transfer unit travels past said first article input or said second input in order to sequence articles between said first and second processing stations.

12. The material-handling system as claimed in claim 11 wherein said second processing station comprises a goods-to-person pick station wherein said second article input supplies containers of goods to an operator and said second article output retrieves containers of goods from the operator.

13. The material-handling system as claimed in claim 11 wherein said first processing station comprises a three-dimensional warehouse having stacked racks, an elevator that is adapted to store articles to levels of the racks and retrieves articles from the levels of the racks and a plurality of shuttles that transfer articles between the elevator and the racks, wherein said first article input supplies articles to said elevator and said first article output discharges articles from said elevator and wherein said second processing station comprises a goods-to-person pick station, wherein said second article input supplies containers of goods to an operator and said second article output retrieves containers of goods from the operator.

14. The material-handling system as claimed in claim 11 wherein said first processing station is located at one lateral side of said linear transfer system and said second

processing station is located at an opposite lateral side of said linear transfer system.

15. The material-handling system as claimed in claim 11 wherein said transfer units comprise cross belt units defining said bidirectional conveying surfaces.

16. The material-handling system as claimed in claim 15 wherein said bidirectional conveying surfaces are each defined by an endless belt that is driven by a motorized roller.

17. The material-handling system as claimed in claim 16 wherein said endless belt has a low modulus of elasticity.

18. The material-handling system as claimed in claim 11 wherein said first processing station comprises a three-dimensional warehouse having stacked racks, an elevator that is adapted to store articles to levels of the racks and retrieves articles from the levels of the racks and a plurality of shuttles that transfer articles between the elevator and the racks, wherein said first article input supplies articles to said elevator and said first article output discharges articles from said elevator.

19. The material-handling system as claimed in claim 11 wherein said transfer units travel in unison in a continuous motion between opposite ends of said track.

20. The material-handling system as claimed in claim 19 wherein said transfer units are interconnected in a train.

21. The material-handling system as claimed in claim 19 including a propulsion system to move said transfer units in said regular motion, said propulsion system comprising a servo motor.

22. The material-handling system as claimed in claim 21 wherein said servo motor travels with said transfer units.

23. The material-handling system as claimed in claim 21 wherein said servo motor is stationary.

24. A material-handling method for use with a first processing station having a first article input and a first article output and a second processing station having a second article input and a second article output; said method comprising:

propelling a plurality of transfer units reciprocatingly along a track in a regular motion between opposite ends of said track past said inputs and outputs, each of said transfer units having a bidirectional conveying surface that is oriented perpendicular to said track thereby providing an article support surface that is configured to support articles and to transport articles to and from that transfer unit transversely of said track; and

controlling said bidirectional conveying surfaces of said transfer units and said first article input, said first article output, said second article input and said second article output to selectively receive an article from one of said outputs to one of said bidirectional conveying surfaces as that conveying surface travels past said first article output or said second article output and to discharge that article from one of said bidirectional conveying surfaces to said first article input or said second article input as that transfer unit travels past said first article input or said second article input in order to sequence articles between said first and second processing stations.