

Description

[0001] The invention relates to a sorting system and a method for sorting parcels by means of such a sorting system.

[0002] Such sorting systems typically comprise:

- a conveyer;
- at least one scanner arranged for scanning scan-readable codes on parcels transported by the conveyer to obtain scan data including a parcel identity information and destination information;
- a series of chutes, connecting laterally to the conveyer;
- ejectors arranged to move a parcel from the conveyer onto a chute;
- a programmable control unit arranged for selective activation of the ejectors responsive to the scan data.

[0003] Parcels are collected at so-called depots or hubs, where they are sorted for transshipment, usually to a further hub or depot where the parcels are finally transshipped for transport to the addressed receivers.

[0004] The chutes are usually roller tables or slides forming a buffer for parcels collected for an associated destination. The control unit associates each chute with a shipment destination. This destination may be changed. Each chute has an upstream end connecting to the conveyer, and a downstream end where parcels can be loaded into a loading unit, such as a cage, a pallet, a unit load device (ULD), a flexible bag container or other suitable type of container. The upstream end of each chute is within operational reach of one of the ejectors.

[0005] After arrival at the hub or depot parcels are collected on the conveyer of the sorting system. The scan-codes on the parcels are scanned before, during or after collecting the parcels on the conveyer. The scan-readable codes on the parcels are usually barcodes, QR-code, RFID-tags or the like. The code serves to identify the parcel and its destination and allows tracking and tracing of the parcel at any moment during shipment. The scan data is sent to the programmable control unit. Based on this data the control unit links each parcel to a chute associated with the same destination as the parcel. When the conveyer moves on the parcel will pass the chute to which it has been linked. At that moment the control unit actuates the ejector at the upstream end of the linked chute. The ejector moves the parcel from the conveyer onto the chute. A worker picks up the parcel from the chute, scans it and puts it into the cage or similar container for further transport, e.g., by a van or truck.

[0006] It is an object of the invention to improve handling efficiency and to reduce the number of work operations by workers.

[0007] The object of the invention is achieved with a method, wherein a loading unit is logged on with the programmable control unit when the loading unit is linked to one of the chutes and the control unit links a loading unit

identity to a chute identity. Subsequently for each parcel that is moved to the associated chute the control unit links the parcel identity to the loading unit identity. After a time period the loading unit is logged off from control unit.

[0008] This enables to keep record of which parcels are shipped in which loading units. There is no need to scan the parcels when they are loaded into the loading unit. This saves a large number of scanning operations by worker loading the loading units and makes the parcel handling process substantially more cost-efficient.

[0009] When a full loading unit is logged off and removed from the chute, a new loading unit can be linked to the chute and logged on with the control unit.

[0010] The control unit may communicate the information to a track and trace system to enable monitoring progress of the complete shipment process, from sender to addressee.

[0011] When a loading unit is logged off, one or more parcels may still be left on the chute. To avoid that the programmable control unit will record that the parcel is in the loading unit that was just logged off, sensors may be used to count the number of parcels actually loaded in the logged off loading unit. Alternatively, the scanner may be configured to determine the volume and/or weight of the passing parcels. In response to this volume and/or weight data the programmable control unit may be programmed to calculate the joint volume of the loaded parcels to enable the control unit to predict when the loading unit is fully loaded.

[0012] To enable easy log on, a loading unit may for example be provided with a scan readable code identifying the loading unit. A scanner, e.g., a hand scanner, can be used to scan the loading unit identity information and to communicate this information to the programmable control unit to log on the loading unit. The scan code on the loading unit can be any suitable type of coding, such as a bar code, QR-code or RFID-tag.

[0013] Optionally, the loading units can be provided with a marker, such as a visual marker, to show a worker the log-on status of the loading unit. For instance, the marker can be a lamp showing a red light or flasher signal if the loading unit is not logged on, and, e.g., a blue or green signal if the loading unit is logged on.

[0014] The loading unit can for example be or comprise a cage, a pallet, a unit load device (ULD), a flexible bag container or any other suitable container or carrier.

[0015] The chutes can for example be roller beds or slides or any other suitable type of chutes.

[0016] The ejectors can be any suitable type of mechanism for discharging parcels from the conveyer to the chute. Such systems are known in the art.

[0017] The chutes connect to one or to both longitudinal sides of the conveyer to allow the ejectors to move the parcel onto the chute.

[0018] The invention also relates to a sorting system for handling parcels, the sorting system comprising:

- a conveyer;
- at least one scanner arranged for scanning scan readable codes on parcels transported by the conveyer to obtain scan data of each scanned parcel including a parcel identity information and destination information;
- a series of chutes, connecting laterally to the conveyer;
- ejectors arranged to move passing parcels from the conveyer onto associated chutes;
- a programmable control unit arranged for selective activation of the ejectors responsive to the scan data and for storing chute identities and associated destination information for each chute;

wherein the control unit is programmed to enable a loading unit to be logged on when the loading unit is linked to a selected chute and to be logged off when the loading unit is removed from the chute, wherein logging on includes input of a loading unit identity and linking the loading unit identity to a chute identity of the selected chute; and wherein the control unit is programmed to keep record of parcel identities of parcels moved to said selected chute in a time period between logging on and logging off of the loading unit.

[0019] Furthermore, the invention also relates to a computer program, or set of computer programs, comprising at least one software code portion or a computer program product storing at least one software code portion, the at least one software code portion being configured for executing the method of the invention when run on the programmable control unit.

[0020] The invention is further explained with reference to the accompanying drawings, showing an exemplary embodiment.

Figure 1: shows a flow chart of the method according to the present invention;

Figure 2: shows a schematic representation of an exemplary embodiment of a sorting system according to the invention.

[0021] Figure 1 shows an exemplary embodiment of a sorting system 1 according to the invention. The sorting system 1 comprises a conveyer 2 with a collecting side 3 where parcels 4 are collected and transported into direction A. At the collecting side 3 a scanner 6 is arranged for scanning barcodes on the parcels 4. The data coded with the barcodes includes a parcel identity information and destination information.

[0022] Chutes 7 connect laterally to one side of the conveyer 1. In an alternative arrangement chutes 7 can be provided at both sides of the conveyer 1. Each chute 7 has an upstream end 8 connecting to the conveyer 1 and a downstream end 9 where parcels 4 can be loaded into a cage 11.

[0023] The upstream ends 8 of the chutes 7 are within reach of ejectors 12a, 12b which can be moved between

an retracted position (ejector 12a in Figure 1) and an ejecting position (12b). When an ejector 12a, 12b is activated it moves from the retracted position to the ejecting position to move a passing parcel 4 from the conveyer 1 onto the respective chute 7.

[0024] A programmable control unit 13 stores data including chute identities and associated destination information for each chute. The control unit 13 receives scan data of each passing parcel 4 from the scanner 6 and allocates the parcel 4 to a chute with the corresponding destination information. When a parcel 4 passes the chute 7 to which it has been allocated, the control unit 9 will activate the respective ejector 12a, 12b to move the parcel 4 onto the chute 7.

[0025] At their downstream ends 9 the chutes 7 are provided with a terminal 14 where a cage 11 can be logged on when the cage 11 is linked to the chute 7. The cage 11 can be logged off when the cage 11 is removed from the chute 7. The control unit 13 is programmed to receive the log-on and log-off data. Logging on includes input of a cage identity and linking the cage identity to a chute identity of the selected chute 7. The control unit 13 is also programmed to keep record of parcel identities of parcels 4 moved to the selected chute in a time period between logging on and logging off of the cage 11.

[0026] The downstream ends 9 of the chutes 7 are also provided with a visual indicator 16, such as a lamp, to indicate whether a cage has been linked to the chute 7 or not.

[0027] The flow chart of Figure 2 shows the individual steps of an exemplary embodiment 101 of the method for sorting and handling parcels for transshipment. The individual steps of the flow chart in Figure 2 are explained with reference to the exemplary sorting system 1 of Figure 1.

[0028] Parcels 4 are collected on the conveyer 1. Each parcel 4 is labeled with a unique scan-readable code, such as a barcode. In step 102 (Figure 2) the scanner 6 scans the scan-readable codes of each passing parcel 4 transported by the conveyer 1. The scan data are sent to the programmable control unit 13.

[0029] The control unit 13 stores chute identities for each of the chutes 7. These chute identities are associated with destination data (step 103). Upon receipt of the scan data of a parcel 4 the control unit 13 links the parcel identity to a chute identity of a chute 7 with matching destination data (step 104). As the conveyer 1 runs, the parcel 4 passes the selected chute 7 (step 105) and the control unit 13 activates the ejector 12a, 12b associated with the selected chute 7 (step 106). In response the ejector 12a, 12b moves the parcel 4 from the conveyer 1 onto the chute 7 (step 107). The parcel 4 is subsequently moved from the chute 7 into a cage 11 (step 108).

[0030] When a cage 11 is positioned at the downstream end 9 of a chute 7, the cage 11 is logged on with the programmable control unit 13 (step 109). In response the control unit 13 links a cage identity of the cage 11 to a chute identity of the chute 7 (step 110). Subsequently

for each parcel 4 that is moved to the chute 7 the control unit 13 links the parcel identity to the cage identity (step 111). This way the control unit 13 is able to determine which individual parcels 4 are within a given cage and to trace which cage contains a given parcel 4.

[0031] After a time period, e.g., after filling the cage 11, the cage 11 is logged off with the control unit 13 and a new cage 11 can be logged on.

Claims

1. Method for handling parcels for transshipment using a sorting system comprising:

- a conveyer;
- at least one scanner arranged for scanning scan-readable codes on parcels transported by the conveyer to obtain scan data including a parcel identity information and destination information;
- a series of chutes, connecting laterally to the conveyer;
- ejectors arranged to move a parcel from the conveyer onto a chute;
- a programmable control unit arranged for selective activation of the ejectors responsive to scanned parcel data, the control unit storing chute identities for each of the chutes, the chute identities being associated with destination data;

wherein the scanner scans said scan readable code of a parcel and sends the scan data to the programmable control unit;

wherein the control unit links the parcel to a chute with a matching destination data and, as the conveyer runs, activates the ejector associated with the selected chute when the parcel passes it, and in response the ejector moves the parcel from the conveyer onto the chute;

wherein subsequently the parcel is moved from the chute into a loading unit;

characterized in that the loading unit is first logged on with the programmable control unit when the loading unit is linked to the chute and the control unit links a loading unit identity to a chute identity; subsequently for each parcel that is moved to the chute the control unit links the parcel identity to the loading unit identity;

after a time period the loading unit is logged off with the control unit.

2. Method according to claim 1, wherein the loading unit is provided with a scan readable code coding a loading unit identity and wherein logging on the loading unit involves scanning the code and communicating the loading unit identity to the programmable

control unit and linking the loading unit identity to a chute identity of the chute to which the loading unit is linked.

3. Method according to claim 2, wherein the scan readable code is a bar code, a QR code or a RFID tag.

4. Method according to any preceding claim, wherein the number, weight and/or joint volume of all parcels assigned to a given chute during the time that a given loading unit is logged-on is determined and compared with the number or weight of the collected parcels in the loading unit after the loading unit has been logged out or with the maximum total loading volume of the loading unit to determine the identity of the parcels left on the chute after the loading unit was logged-off.

5. Method according to any preceding claim, wherein a marker is used to indicate whether or not a loading unit is logged-in.

6. Method according to claim 5, wherein the marker comprises a lamp providing a color coded visual signal.

7. Sorting system for handling parcels, comprising:

- a conveyer;
- at least one scanner arranged for scanning scan readable codes on parcels transported by the conveyer to obtain scan data of each scanned parcel including a parcel identity information and destination information;
- a series of chutes, connecting laterally to the conveyer;
- ejectors arranged to move passing parcels from the conveyer onto associated chutes;
- a programmable control unit arranged for selective activation of the ejectors responsive to the scan data and storing chute identities and associated destination information for each chute;

wherein the control unit is programmed to enable a loading unit to be logged on when the loading unit is linked to a selected chute and to be logged off when the loading unit is removed from the chute, wherein logging on includes input of a loading unit identity and linking the loading unit identity to a chute identity of the selected chute;

and wherein the control unit is programmed to keep record of parcel identities of parcels moved to said selected chute in a time period between logging on and logging off of the loading unit.

8. A computer program, or set of computer programs, comprising at least one software code portion or a

computer program product storing at least one software code portion, the at least one software code portion being configured for executing the method according to one or more of the claims 1-6 when run on the programmable control unit.

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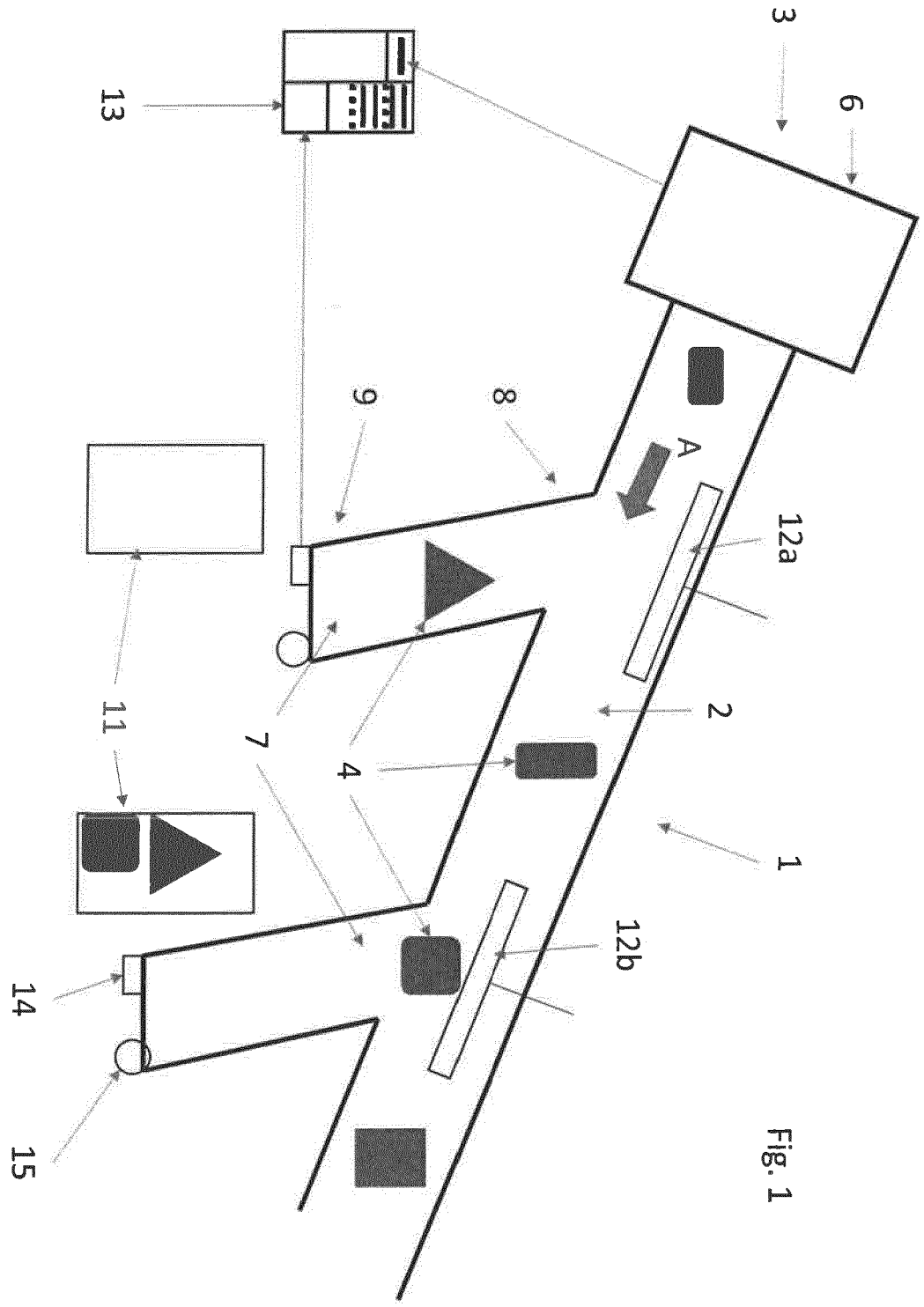
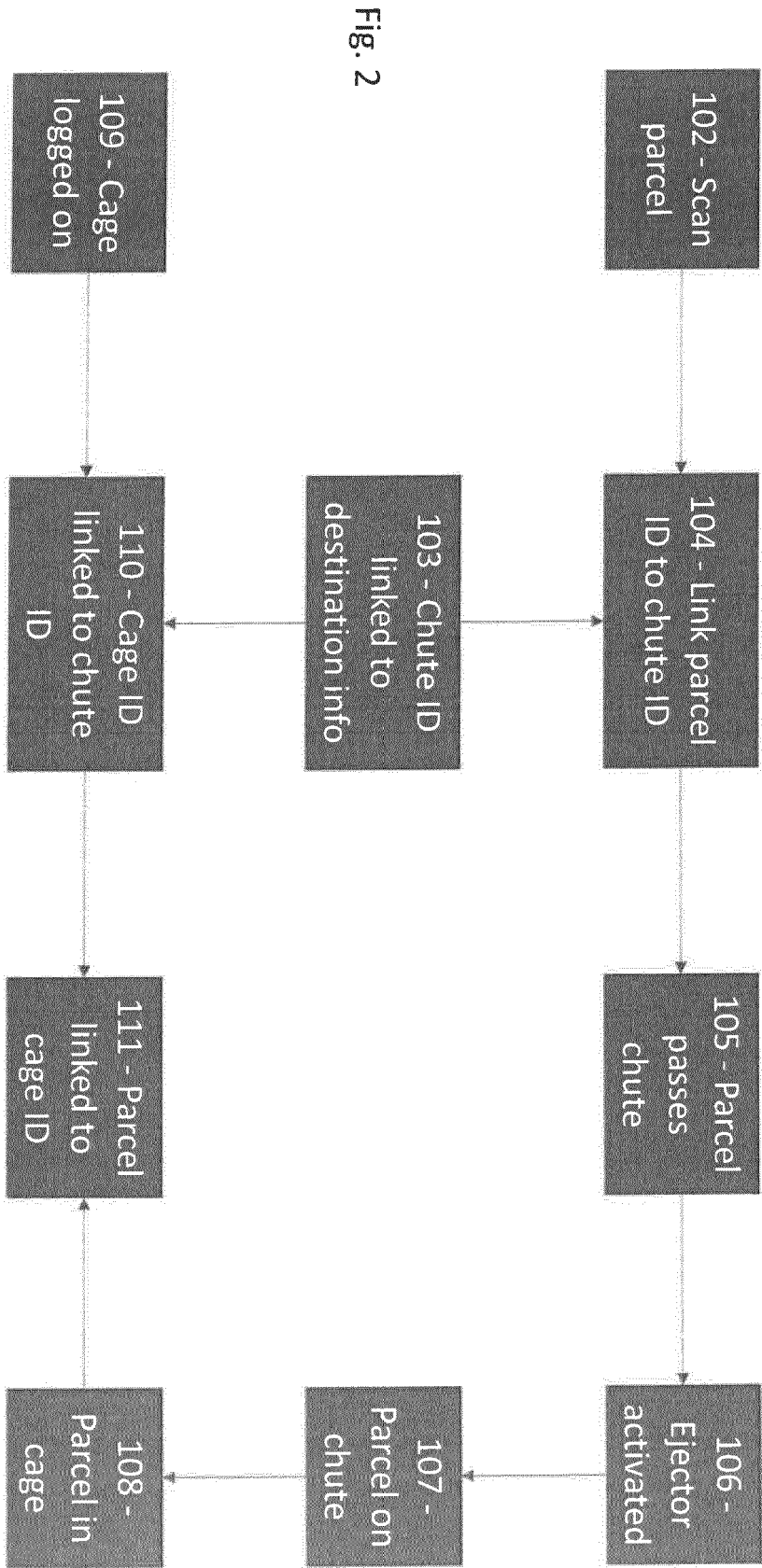


Fig. 1





EUROPEAN SEARCH REPORT

Application Number
EP 16 17 8217

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 0 540 464 A2 (MUELLER MARTINI VERSAND SYSTEM [CH]) 5 May 1993 (1993-05-05) * figures *	1-8	INV. B07C3/06
A	US 4 832 204 A (HANDY STEVEN W [US] ET AL) 23 May 1989 (1989-05-23) * figures *	1-8	
A	WO 99/21663 A1 (SANDVIK AB [SE]) 6 May 1999 (1999-05-06) * figures *	1-8	
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			TECHNICAL FIELDS SEARCHED (IPC)
			B07C B64F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 3 November 2016	Examiner Wich, Roland
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 16 17 8217

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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03-11-2016

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