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(54) **Method and apparatus for loading and unloading containers in a mail processing system**

Verfahren und Vorrichtung zum Be- und Entladen von Containern bei einem System zum Postsortieren

Méthode et appareil pour décharger et charger de récipients dans un système de triage du courrier

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Description

Background of the Invention

[0001] The various embodiments described herein relate generally to a mail processing system. More particularly, these embodiments relate to a method and apparatus for loading and unloading containers in such a system.

[0002] Each day postal services process mail items for delivery to millions of individual domestic addresses. As used throughout this application, mail items refer to letters, magazines, books and other such flat items. Before mail carriers begin to walk through or drive through their delivery routes, a mail processing system at a processing site sorts all mail items for the carriers and prepares the sorted mail items for delivery to a multitude of domestic addresses. A carrier's responsibility includes putting all of these mail items into an appropriate sequence for efficient delivery to the domestic addresses.

[0003] The mail processing system is highly automated to handle the amount of daily mail items. Some mail processing systems may include a delivery point packaging (DPP) system that, for example, separates the mail items, reads their destination addresses and groups the mail items based upon their respective destination addresses see e.g. US-A-3 148 783. An exemplary DPP system is an automatic casing system which may comprise two U-shaped casing towers arranged side by side. Each tower carries, on a given member of levels, vertical oriented slots. The slots may be grouped in containers or pods wherein most or all mail for a delivery point is inserted. The insertion may be effected by autonomous moving vehicles. Each of the vehicles may carry one piece of mail. Each of the two casing towers may be further connected to two loading points. Each loading point may further be connected to one or more feeders via a conveyor system. After the mail is appropriately sorted, the mail needs to be extracted. The containers are transported to extracting stations where carousel-like apparatuses are used to exchange full containers with empty containers.

Summary of Certain Inventive Aspects

[0004] A general aspect of a mail processing system is to operate as efficient and reliable as possible and as inexpensive as possible. One parameter that influences efficiency, reliability, and operating costs is the operational speed at the extraction stations. The unloading of full mail containers from the various levels of the processing system and the loading of empty containers to these levels may be done using a lift, which vertically connects the levels at the extraction stations. However, a lift has a limited capacity due to idle strokes and a limited operational speed. There is, therefore, a need for an improved technique for loading and unloading containers.

[0005] Accordingly, one aspect involves a method of

loading and unloading mail containers in a mail processing system having a conveyor system with a first level and a second level, an elevator installation and a carousel carrier. A predetermined number of first mail containers is fed from the first level of the conveyor to a predetermined number of platforms of the elevator installation, wherein the predetermined number of first mail containers is the same as the predetermined number of tablets. The first mail containers are simultaneously transferred to a predetermined number of platforms of the carousel carrier, wherein the predetermined number of platforms is the same as the predetermined number of tablets.

[0006] Another aspect involves a mail processing system having a conveyor with a first level and a second level and configured to convey mail containers. An elevator installation is coupled to receive and output mail containers from and to the conveyor, wherein the elevator installation includes tablets configured to move along a closed loop extending along first and second sides of the elevator installation. On each side a predetermined number of tablets extends between a top end and a bottom end of the elevator installation. A carousel carrier is coupled to receive and output mail containers from and to the elevator installation. The carousel carrier has a vertical column of a predetermined number of platforms arranged between a top end and a bottom end of the carousel carrier, wherein the number of tablets is the same as the number of platforms.

Brief Description of the Drawings

[0007] These and other aspects, advantages and novel features of the embodiments described herein will become apparent upon reading the following detailed description and upon reference to the accompanying drawings. In the drawings, same elements have the same reference numerals. In the following list of figures:

Figure 1 depicts a schematic overview of one embodiment of a mail processing system;

Figure 2 is a schematic illustration of a first embodiment of a method of loading and unloading containers used in the system of Figure 1; and

Figure 3 is a schematic illustration of a second embodiment of a method of loading and unloading containers used in the system of Figure 1.

Detailed Description of Certain Inventive Embodiments

[0008] Figure 1 shows a schematic illustration of a top view of one exemplary embodiment of a mail processing system to provide for a general overview of a mail processing system. The illustration depicts basic flows and functional relationships within the system. These basic flows and functional relationships are represented in Figure 1 through functional blocks for a feeding section FS, a routing area RA, a casing area CA and an extraction area EA. These functional blocks represent some of the

main functional features of the system. Those of ordinary skill in the art of mail processing systems will appreciate that the system may include a variety of other functional features. Further, it is contemplated that the separation into these functional blocks is arbitrary and that the blocks may be shown in a different arrangement without affecting the principal operation of the system. A more detailed description of one embodiment of the system and its structural components follows.

[0009] Briefly, the feeding section FS separates individual mail items from batches to identify their individual destination addresses. For that purpose, the feeding section FS includes in one embodiment feeders 3, 5 and optical character readers (OCR) or bar code readers, or a combination of these readers. After a successful identification of the destination addresses, the feeder section FS hands the mail items to the routing area RA. The routing area RA includes loading points 4, 6 coupled to the feeders 3, 5 and an infrastructure that transports the mail items according to their destination addresses to the casing area CA. The casing area CA is embedded in the routing area RA and includes a predetermined number of casing towers 1 that have slots for the mail items. Each slot represents an individual destination address. Once the mail items are delivered to the slots, extraction and packaging modules 2 in the extraction area EA extract the mail items from the slots and pack the mail items on a per destination address basis.

[0010] The various embodiments of the mail processing system described hereinafter relate mainly to the extraction area EA.

[0011] Figures 2 and 3 are schematic illustrations of embodiments of a method of loading and unloading containers used in the system of Figure 1. Each one of these figures depicts a first cycle ("Cycle n") with four illustrated states, and a second identical cycle ("Cycle n+1"), of which only the first state is illustrated. For each state, the extraction area is illustrated by means of a two-level conveyor system 12, an elevator installation 10 and a multi-level carousel carrier 14.

[0012] The two-level conveyor system 12 has a first level 12a and a second level 12b. Each level 12a, 12b includes a conveyor that is independent from the other conveyor. Each conveyor moves in one direction.

[0013] The elevator installation 10 is positioned between the two-level conveyor system 12 and the multi-level carousel carrier 14. The illustrated elevator installation 10 functions similar to an elevator known as "paternoster elevator." Such an elevator has a number of platforms that move along a closed loop. For example, in a building a paternoster elevator moves up on one side and down on the other side. The movement of such an elevator is continuous and passengers board and leave the elevator while the elevator continues to move. The elevator installation 10 may be also configured as a Ferris wheel paternoster elevator.

[0014] Accordingly, the elevator installation 10 includes a support structure that rests on a base element.

The support structure houses, among other elements, a number of tablets 16 and a power train system 18. The tablets 16 are coupled to the power train system 18 that drives and guides the tablets 16 along a closed vertical loop. A part of the power train system 18 divides the elevator installation 10 in a left side and a right side that are connected at the top and bottom of the elevator installation 10. The tablets 16 on either side move in opposite directions. For example, the tablets 16 on the left side move down, whereas the tablets 16 on the right side move up, or vice versa.

[0015] In the illustrated embodiment, the elevator installation 10 is configured so that there are six tablets 16 on each side. Hence, the tablets 16 can transport, for example, twelve containers at any time. It is contemplated that the levels 12a, 12b of the conveyor system 12 are assigned to two tablets 16. In Figures 2 and 3, the first level 12a (top level) is assigned to the uppermost tablet 16 on the left side of the elevator installation 10, whereas the second level 12b (bottom level) is assigned to the lowermost tablet 16. The power train system 18 operates the elevator installation 10, for example, on a step-by-step basis so that each tablet 16 moves up or down one step at a time.

[0016] The multi-level carousel carrier 14 has a number of platforms 20 selected to correspond to the number of tablets 16 of the elevator installation 10. The carousel carrier 14 is configured to rotate about a vertical axis 24 on both ends of the carousel, or to move straight along the sides of the carousel. In either position of this process, loading and unloading stations may be positioned in order to transport full containers received from the elevator installation 10 away, and to supply empty containers to the elevator installation 10.

[0017] Referring to Figure 2, the top level 12a of the conveyor system 12 provides empty containers to the elevator installation 10, whereas the carousel carrier 14 receives the empty containers and supplies full containers, which the bottom level 12b transports away. It is contemplated that the step-by-step operation mentioned above is independent of whether a lateral or Ferris wheel paternoster elevator is used. In State 1, the tablets 16 of the elevator installation 10 are loaded with containers. Full containers A1-A6 are placed on the tablets 16 on the left side, and empty containers B1-B6 are placed on the right side. An arrow 22 indicates that the empty containers B1-B6 are to be transferred to the carousel carrier 14. Empty platforms 20 of the carousel carrier 14 face the elevator installation 10 and align with its tablets 16. The next group of empty containers (only two containers C1, C2 of a group of six are shown) awaits delivery to the elevator installation 10 on the top level 12a.

[0018] In State 2, the empty containers B1-B6 have been transferred to the platforms 20 of the carousel carrier 14. The carousel carrier 14 is activated to rotate about the axis 24 to transport the empty containers B1-B6 away, as indicated by an arrow 28. The tablets 16 on the right side of the elevator installation 10 are empty. Further,

the elevator installation 10 is activated to transport the tablets 16 counterclockwise, as indicated by an arrow 26. The tablets 16 on the left side move downwards, wherein each time a tablet 16 reaches the bottom level 12 a full container is transferred to the bottom level 12b of the conveyor system 12, as indicated by an arrow 32. With the tablets 16 moving counterclockwise, empty tablets 16 are transported from the right to the left side and become available for loading with empty containers C1, C2, as indicated by an arrow 30.

[0019] In State 3, the tablets 16 of the right side of the elevator installation 10 have been loaded with empty containers C1-C6, while the bottom level 12b of the conveyor system 12 transports the full containers A1-A6 away. The tablets 16 of the right side are empty. The platforms 20 of the carousel carrier 14 are loaded with full containers D1-D6, which await transfer to the tablets 16 on the right side, as indicated by an arrow 34.

[0020] In State 4, the tablets 16 of the left side of the elevator installation 10 are loaded with empty containers C1-C6. The tablets 16 of the right side carry now the full containers D1-D6. Subsequently, the elevator installation 10 turns about a vertical axis 38, as indicated by an arrow 36, for example, counterclockwise by about 180°. The system is now available for the next cycle.

[0021] In State 1 of the next cycle (Cycle n+1), the tablets 16 of the left side of the elevator installation 10 (after the turn in State 4) are loaded with the full containers D1-D6, whereas the tablets 16 of the right side carry now the empty containers C1-C6. Similar to State 1 of the previous cycle (Cycle n), the top level 12a of the conveyor system 12 supplies empty containers E1, E2 for transfer to the elevator installation 10.

[0022] In the embodiment of Figure 2, the orientation of the containers changes by 180° during the loading or unloading process due to the turning of the elevator installation 10 in State 4. For illustrative purposes, each container includes an orientation mark 17. For example, in State 4 the orientation marks 17 of the containers D1-D6 point to the right, whereas they point to the left in State 1 of Cycle n+1. The elevator installation 10 may be a lateral or a Ferris wheel paternoster elevator. If the orientation of the mail container should be unchanged, the elevator installation 10 is a Ferris wheel paternoster elevator that may not turn around a vertical axis, as shown in Figure 3.

[0023] In Figure 3, as mentioned above, the extraction area is illustrated by means of a two-level conveyor system 12, an elevator installation 10 and a multi-level carousel carrier 14. The two-level conveyor system 12 and the carousel carrier 14 correspond to the ones described with reference to Figure 2.

[0024] In State 1, the tablets 16 of the elevator installation 10 are loaded with containers. Empty containers A1-A6 are placed on the tablets 16 on the left side, whereas the bottom level 12b of the conveyor system 12 transports full containers B1, B2 away. The tablets 16 on the right side of the elevator installation 10 are empty. An

arrow 40 indicates that the empty containers A1-A6 are to be transferred through the elevator installation 10 to the carousel carrier 14. Empty platforms 20 of the carousel carrier 14 face the elevator installation 10 and align with its tablets 16. The next group of empty containers (only two containers C1, C2 of a group of six are shown) awaits delivery to the elevator installation 10.

[0025] In State 2, the empty containers A1-A6 have been transferred to the platforms 20 of the carousel carrier 14. The carousel carrier 14 is activated to rotate about the axis 24 to transport the empty containers A1-A6 away, as indicated by an arrow 28. The tablets 16 on both sides of the elevator installation 10 are empty.

[0026] In State 3, the platforms 20 of the carousel carrier 14 carry full containers D1-D6, which await transfer to the tablets 16 on the right side, as indicated by an arrow 42.

[0027] In State 4, the full containers D1-D6 have been transferred to the tablets 16 on the right side and from there through the elevator installation 10 to the left side. The elevator installation 10 is activated to rotate counterclockwise, as indicated by an arrow 44. The full containers D1-D6 are now on the left side of the elevator installation 10 and move downwards, wherein each time a tablet 16 reaches the bottom level 12b a full container is transferred to the bottom level 12b of the conveyor system 12, as indicated by an arrow 46. With the tablets 16 moving counterclockwise, empty tablets 16 are transported from the right to the left side and become available for loading with empty containers B1, B2, as indicated by an arrow 48. The system is now available for the next cycle.

[0028] In State 1 of the next cycle (Cycle n+1), the tablets 16 of the left side of the elevator installation 10 are loaded with the empty containers B1-B6, whereas the tablets 16 of the right side are empty. Similar to State 1 of the previous cycle (Cycle n), the top level 12a of the conveyor system 12 supplies empty containers E1, E2 for transfer to the elevator installation 10.

[0029] It is apparent that there has been disclosed an apparatus and method for loading and unloading containers that fully satisfy the objects, means, and advantages set forth hereinbefore. For example, the embodiments allow continuous operation of the elevator installation that avoids any idle strokes necessary in conventional lifts. Further, the use of an elevator installation that has the same number of tablets as the carousel has platforms provides the highest number of simultaneously loaded or unloaded containers, and, therefore, maximum performance. The use of the elevator installation avoids transporting containers over top.

Claims

1. A method of loading and unloading mail containers in a mail processing system having a conveyor system (12) with a first level (12a) and a second level

(12b), an elevator installation (10) and a carousel carrier (14), comprising:

- feeding a predetermined number of first mail containers from the first level (12a) of the conveyor system (12) to a predetermined number of tablets (16) of the elevator installation (10), wherein the predetermined number of first mail containers is the same as the predetermined number of tablets (16); and
transferring the first mail containers simultaneously to predetermined number of platforms (20) of the carousel carrier (14), wherein the predetermined number of platforms (20) is the same as the predetermined number of tablets (16).
2. The method of Claim 1, wherein feeding the first mail containers includes transferring each first mail container from the first level (12a) to a tablet (16) at an upper end of the elevator installation (10).
3. The method of Claim 2, further comprising transferring each first mail container from a tablet (16) at a bottom end of the elevator installation (10) to the second level (12b) of the conveyor system (12).
4. The method of Claim 3, wherein transferring each first mail container from the first level (12a) to a tablet (16) at an upper end, and transferring each first mail container from a tablet (16) at a bottom end of the elevator installation (10) to the second level (12b) occurs contemporaneously.
5. The method of Claim 4, further comprising activating the elevator installation (10) to transfer each tablet (16) from the upper end to the bottom end.
6. The method of Claim 5, further comprising transferring the tablets (16) along a closed loop.
7. The method of any preceding claim, further comprising turning the carousel carrier (14) about a vertical axis or translating the carousel carrier (14) so as to exchange a first vertical column of platforms (20) with a second vertical column of platforms (20).
8. The method of any preceding claim, further comprising turning the elevator installation (10) about a vertical axis
9. A mail processing system, comprising:
 - a conveyor system (12) having a first level (12a) and a second level (12b) and configured to convey mail containers;
 - an elevator installation (10) coupled to receive and output mail containers from and to the conveyor system (12), wherein the elevator instal-

lation (10) includes tablets (16) configured to move along a closed loop extending along first and second sides of the elevator installation (10), wherein on each side a predetermined number of tablets (16) extends between a top end and a bottom end of the elevator installation; and

a carousel carrier (14) coupled to receive and output mail containers from and to the elevator installation (10), wherein the carousel carrier (14) has a vertical column of a predetermined number of platforms (20) arranged between a top end and a bottom end of the carousel carrier (14), wherein the number of tablets (16) is the same as the number of platforms (20).

10. The system of Claim 8, wherein the first level (12a) of the conveyor system (12) is coupled to feed mail containers to a tablet (16) at the top end of the elevator installation (10), and wherein the second level (12b) of the conveyor system (12) is coupled to receive mail containers from a tablet (16) at the bottom end of the elevator installation (10).
11. The system of Claim 8 or 9, wherein the carousel carrier (14) is configured to turn about a vertical axis so as to exchange a first vertical column of platforms (20) with a second vertical column of platforms (20).
12. The system of Claims 8, 9 or 10, wherein the elevator installation (10) is configured to turn about a vertical axis so as to move the first side from facing the conveyor (12) to face the carousel carrier (14).
13. The system of any one of Claims 9-12, wherein the elevator installation (10) includes a lateral paternoster elevator or a Ferris wheel elevator.

Patentansprüche

1. Verfahren zum Auf- und Abladen von Postbehältern in einem Postsortiersystem mit einer Förderanlage (12) mit einer ersten Ebene (12a) und einer zweiten Ebene (12b), einer Aufzuganlage (10) und einem Karussellträger (14), welches Folgendes umfasst:

Zuführen einer vorgegebenen Anzahl erster Postbehälter aus der ersten Ebene (12a) der Förderanlage (12) auf eine vorgegebene Anzahl Tablett (16) der Aufzuganlage (10), wobei die vorgegebene Anzahl der ersten Postbehälter der vorgegebenen Anzahl der Tablett (16) entspricht, und
gleichzeitiges Transferieren der ersten Postbehälter auf eine vorgegebene Anzahl Plattformen (20) des Karussellträgers (14), wobei die vorgegebene Anzahl Plattformen (20) der vorgegebenen

nen Anzahl Tablett (16) entspricht.

2. Verfahren nach Anspruch 1, bei dem das Zuführen der ersten Postbehälter das Transferieren jedes ersten Postbehälters von der ersten Ebene (12a) auf ein Tablett (16) an einem oberen Ende der Aufzuganlage (10) umfasst. 5
3. Verfahren nach Anspruch 2, das des Weiteren das Transferieren jedes ersten Postbehälters von einem Tablett (16) an einem unteren Ende der Aufzuganlage (10) auf die zweite Ebene (12b) der Förderanlage (12) umfasst. 10
4. Verfahren nach Anspruch 3, bei dem das Transferieren jedes ersten Postbehälters von der ersten Ebene (12a) auf ein Tablett (16) an einem oberen Ende und das Transferieren jedes ersten Postbehälters von einem Tablett (16) an einem unteren Ende der Aufzuganlage (10) auf die zweite Ebene (12b) gleichzeitig erfolgen. 15
5. Verfahren nach Anspruch 4, das des Weiteren das Aktivieren der Aufzuganlage (10) zum Transferieren jedes Tablett (16) vom oberen zum unteren Ende umfasst. 20
6. Verfahren nach Anspruch 5, das des Weiteren das Transferieren der Tablett (16) in einem geschlossenen Kreislauf umfasst. 25
7. Verfahren nach einem der vorhergehenden Ansprüche, das des Weiteren Folgendes umfasst: Drehen des Karussellträgers (14) um eine vertikale Achse oder Verschieben des Karussellträgers (14) dergestalt, dass eine erste Standsäule mit Plattformen (20) durch eine zweite Standsäule mit Plattformen (20) ersetzt wird. 30
8. Verfahren nach einem der vorhergehenden Ansprüche, das des Weiteren das Drehen der Aufzuganlage (10) um eine vertikale Achse umfasst. 35
9. Postsortiersystem, das Folgendes umfasst: 40

eine Förderanlage (12) mit einer ersten Ebene (12a) und einer zweiten Ebene (12b), die so ausgelegt ist, dass sie Postbehälter befördert, eine Aufzuganlage (10), die so gekoppelt ist, dass sie Postbehälter aus der Förderanlage (12) aufnimmt und an diese ausgibt, wobei die Aufzuganlage (10) Tablett (16) aufweist, die so ausgelegt sind, dass sie sich in einem geschlossenen Kreislauf bewegen, der an einer ersten und einer zweiten Seite der Aufzuganlage (10) entlang verläuft, wobei auf jeder Seite zwischen einem oberen und einem unteren Ende der Aufzuganlage eine vorgegebene Anzahl Tablett 45

(16) verläuft, und einen Karussellträger (14), der so gekoppelt ist, dass er Postbehälter aus der Förderanlage (10) aufnimmt und an diese ausgibt, wobei der Karussellträger (14) eine Standsäule mit einer vorgegebenen Anzahl Plattformen (20) aufweist, die zwischen einem oberen und einem unteren Ende des Karussellträgers (14) angeordnet sind, wobei die Anzahl der Tablett (16) der Anzahl der Plattformen (20) entspricht.

10. System nach Anspruch 8, bei dem die erste Ebene (12a) der Förderanlage (12) so gekoppelt ist, dass sie Postbehälter auf ein Tablett (16) am oberen Ende der Aufzuganlage (10) zuführt, und die zweite Ebene (12b) der Förderanlage (12) so gekoppelt ist, dass sie Postbehälter von einem Tablett (16) am unteren Ende der Aufzuganlage (10) aufnimmt.
11. System nach Anspruch 8 oder 9, bei dem der Karussellträger (14) so ausgelegt ist, dass er sich so um eine vertikale Achse dreht, dass eine erste Standsäule mit Plattformen (20) durch eine zweite Standsäule mit Plattformen (20) ersetzt wird.
12. System nach Anspruch 8, 9 oder 10, bei dem Aufzuganlage (10) so ausgelegt ist, dass sie sich um eine vertikale Achse dreht, so dass die erste Seite so bewegt wird, dass sie statt dem Förderband (12) dem Karussellträger (14) zugewandt ist.
13. System nach einem der Ansprüche 9 bis 12, bei dem die Aufzuganlage (10) einen seitlichen Paternoster-aufzug oder ein Heberad aufweist.

Revendications

1. Procédé pour charger et décharger des récipients de courrier dans un système de traitement du courrier, comprenant un système (12) de convoyeur ayant un premier niveau (12a) et un deuxième niveau (12b), une installation (10) d'ascenseur et un support (14) de carrousel, dans lequel :

on charge un nombre déterminé à l'avance de premiers conteneurs de courrier du premier niveau (12a) du système (12) de convoyeur à un nombre déterminé à l'avance de tablettes (16) de l'installation (10) d'ascenseur, le nombre déterminé à l'avance de premiers conteneurs de courrier étant le même que le nombre déterminé à l'avance de tablettes (16) ; et on transfère les premiers conteneurs de courrier simultanément à un nombre déterminé à l'avance de plates-formes (20) du support (14) de carrousel, le nombre déterminé à l'avance de plates-formes (20) étant le même que le nom-

- bre déterminé à l'avance de tablettes (16).
2. Procédé suivant la revendication 1, dans lequel le chargement des premiers conteneurs de courrier comprend le transfert de chaque premier conteneur de courrier du premier niveau (12a) à une tablette (16) à une extrémité en haut de l'installation (10) d'ascenseur. 5
 3. Procédé suivant la revendication 2, comprenant, en outre, le transfert de chaque premier conteneur de courrier d'une tablette (16) à une extrémité en bas de l'installation (10) d'ascenseur au deuxième niveau (12b) du système (12) de convoyeur. 10
 4. Procédé suivant la revendication 3, dans lequel le transfert de chaque premier conteneur de courrier du premier niveau (12a) à une tablette (16) à une extrémité en haut et le transfert de chaque premier conteneur de courrier d'une tablette (16) à une extrémité en bas de l'installation (10) d'ascenseur au deuxième niveau (12b) se produisent simultanément. 15
 5. Procédé suivant la revendication 4, comprenant, en outre, l'activation de l'installation (10) d'ascenseur pour transférer chaque tablette (16) de l'extrémité en haut à l'extrémité en bas. 25
 6. Procédé suivant la revendication 5, comprenant, en outre, le transfert des tablettes (16) suivant une boucle fermée. 30
 7. Procédé suivant l'une quelconque des revendications précédentes, comprenant, en outre, le fait de faire tourner le support (14) de carrousel autour d'un axe vertical ou de déplacer en translation le support (14) de carrousel, de manière à remplacer une première colonne verticale de plates-formes (20) par une deuxième colonne verticale de plates-formes (20). 35 40
 8. Procédé suivant l'une quelconque des revendications précédentes, comprenant, en outre, le fait de faire tourner l'installation (10) d'ascenseur autour d'un axe vertical. 45
 9. Système de traitement du courrier comprenant :
 - un système (12) de convoyeur ayant un premier niveau (12a) et un deuxième niveau (12b) et configuré pour convoyer des conteneurs de courrier ;
 - une installation (10) d'ascenseur couplée pour recevoir des conteneurs de courrier du système (12) de convoyeur et les faire sortir vers celui-ci, l'installation (10) d'ascenseur comprenant des tablettes (16) configurées pour se mouvoir 50

suivant une boucle fermée s'étendant le long de premier et deuxième côtés de l'installation (10) d'ascenseur, un nombre déterminé à l'avance de tablettes (16) s'étendant de chaque côté entre une extrémité en haut et une extrémité en bas de l'installation d'ascenseur ; et un support (14) de carrousel couplé pour recevoir des conteneurs de courrier de l'installation (10) d'ascenseur et pour les envoyer à celle-ci, le support (14) de carrousel ayant une colonne verticale d'un nombre déterminé à l'avance de plates-formes (20) disposées entre une extrémité au sommet et une extrémité en bas du support (14) de carrousel, le nombre des tablettes (16) étant le même que le nombre des plates-formes (20).

10. Système suivant la revendication 9, dans lequel le premier niveau (12a) du système (12) de convoyeur est couplé pour charger des conteneurs de courrier sur une tablette (16) à l'extrémité en haut de l'installation (10) d'ascenseur, et dans lequel le deuxième niveau (12b) du système (12) de convoyeur est couplé pour recevoir des conteneurs de courrier d'une tablette (16) à l'extrémité en bas de l'installation (10) d'ascenseur. 20
11. Système suivant la revendication 9 ou 10, dans lequel le support (14) de carrousel est configuré pour tourner autour d'un axe vertical, de manière à remplacer une première colonne verticale de plates-formes (20) par une deuxième colonne verticale de plates-formes (20).
12. Système suivant les revendications 9, 10 ou 11, dans lequel l'installation (10) d'ascenseur est configurée pour tourner autour d'un axe vertical de manière à déplacer le premier côté qui fait face au convoyeur (12) pour qu'il fasse face au support (14) de carrousel. 35
13. Système suivant l'une quelconque des revendications 9 à 12, dans lequel l'installation (10) d'ascenseur comprend un élévateur latéral paternoster ou un élévateur à roue de Ferris. 40

FIG 1

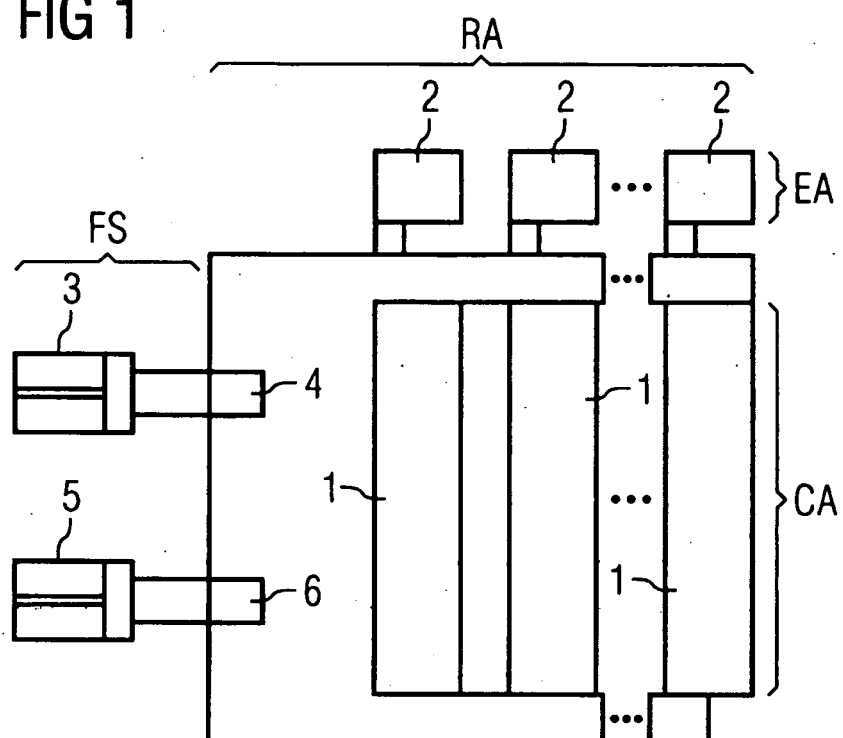


FIG 2

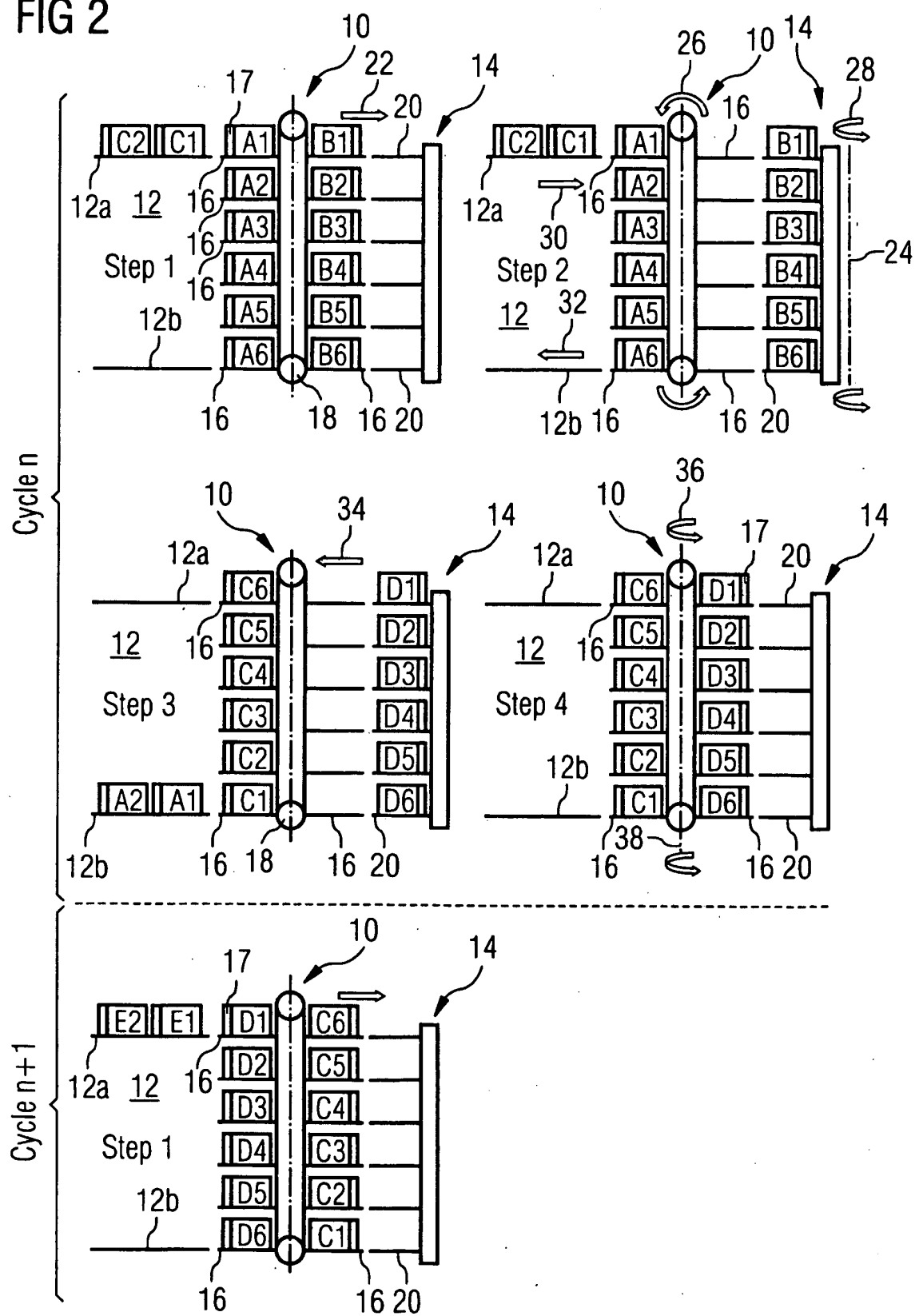
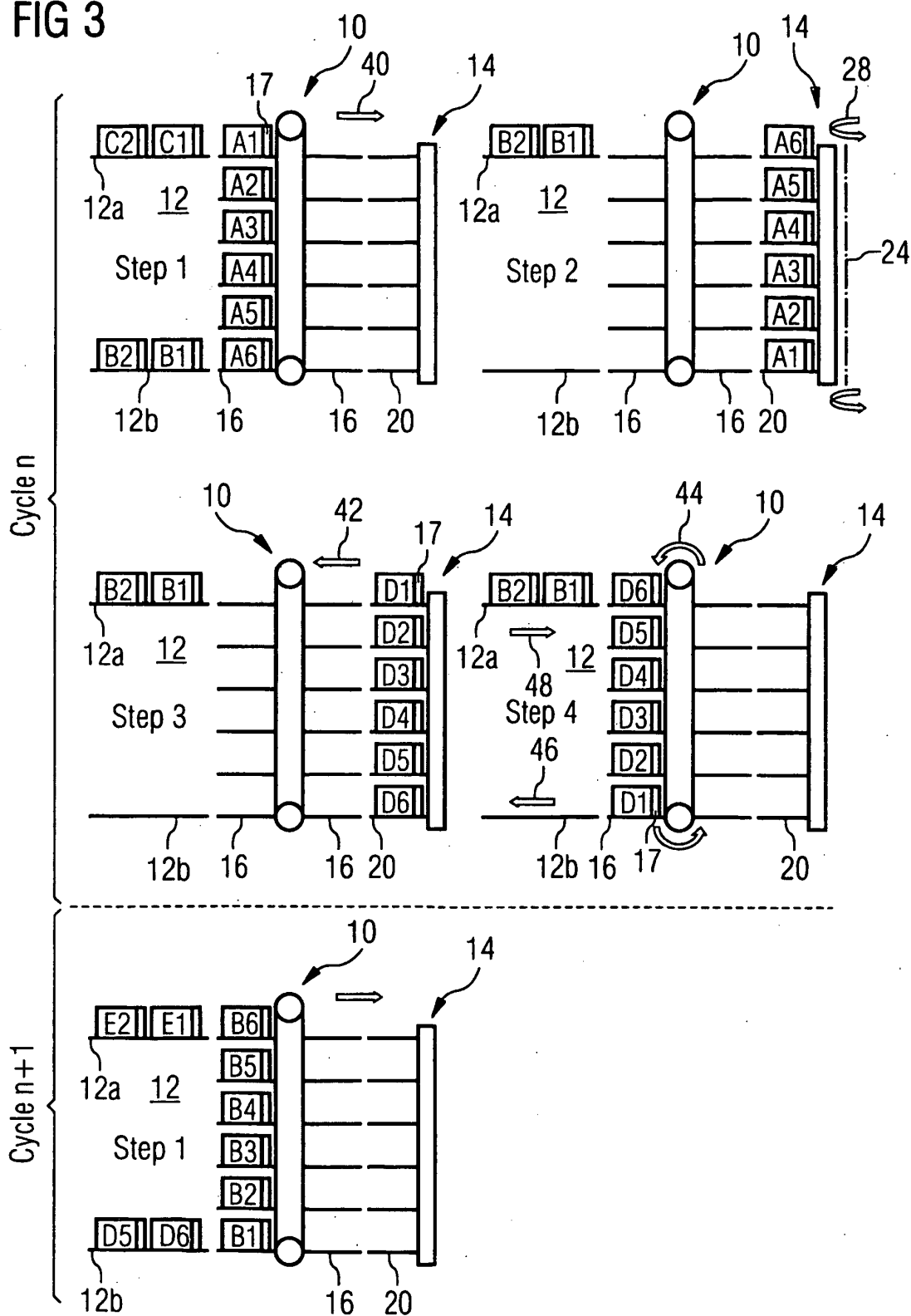


FIG 3



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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