METHOD AND DEVICE FOR PROVIDING BUNDLED BAGS OF MEDICINES IN AN INDIVIDUALISED MANNER

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ABSTRACT
Methods and devices are disclosed wherein, following the introduction of a series or string of interconnected bags (2), a number of bags belonging together are automatically deposited in trays (3) in zigzag fashion, physically separated from each other, or automatically wound onto reels (12). Readable information is printed on the bags, which information indicates that the bags belong together; because their contents, usually medicinal tablets, are intended for the same entity. Said entity may for example be persons or animals in a particular department or on a particular floor level of a home for the elderly, a nursing home, a hospital. Said entity may also be a single person or a group of patients who regularly need specific medicines, frequently in exactly the prescribed order and at exact points in time. The medicines in the distributed trays or on the reels can thus be made available to the patients in an individualised manner and in the correct order.
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[0001] The present invention relates to methods for processing a series or a string of interconnected bags filled with objects, such as medicinal tablets.

[0002] The present invention further relates to devices for providing said bags after said processing.

[0003] Known methods and devices are not capable of automatically processing series of bags and providing said bags in a state suitable for distribution, sorted and individualised according to entity.

[0004] The object of the present invention is to provide improved methods and devices which do not exhibit the above drawbacks.

[0005] In order to accomplish that object, the methods and devices exhibit the features defined in claims 1, 9 and 11, 16, respectively.

[0006] The advantage of said methods and devices is that after the introduction of a series or a string of interconnected bags, a number of bags belonging together are automatically deposited in trays in zigzag fashion, physically separated from each other, or automatically wound onto reels or wound into a roll. No human action is involved in this process, which minimises the risk of mistakes. Readable information has been printed on the bags at an earlier stage, for example after verification of the contents of the bags by means of an inspection device, as known from WO 2004/072626, which information indicates, among other things, that the bags belong together, because their contents, which usually consist of medicinal tablets, are intended for the same entity. Said entity may for example be thought of as persons or animals in a particular department or on a particular floor level of a home for elderly, a nursing home, a hospital. Said entity may also be a single person or a group of patients who regularly need specific medicines, frequently in exactly the prescribed order and at exact points in time.

[0011] An object of the present invention is to provide a method and device for processing a series or a string of interconnected bags filled with objects or medicines. The in-feed means 4 shown in FIGS. 1 and 2 are in this case configured as two driven conveyor belts 4-1 and 4-2 disposed one above the other, with a gap present therebetween, which are lined with a slightly elastic, resilient material on the outer sides, which translate substantially parallel to each other, between which the bags 2 are clamped and moved from the right to the left in the figure. Upon leaving the in-feed means 4, the bags 2 are separated into series of bags 2 passing a reading device 5, for example a bar code reader, and separating means 6, which are both connected to a general purpose computer control system C (schematically indicated) yet to be explained.

[0015] Then a first row of bags 2 from the series is moved over a spoon 7, which is slidably movable in a substantially horizontal plane, under which spoon 7 a tray supplied by tray-supplying means 8 mounted in the device 1 is positioned. The arrival of the first row at the end of the path over the spoon 7 is detected by several sensors (not shown) connected to the control system C, whereupon the spoon 7 moves away from its position under the first row at the command of the control system C and the first row drops into the tray 3 positioned thereunder. Then the spoon 7 is moved onto the first row of bags in the tray so as to hold said bags in position therein. Furthermore, a horizontally movable carrier element 9 is moved into position, causing the row of bags to be deflected, which carrier element 9 may furthermore guide the movement of a second row of bags over the spoon 7. The carrier element 9 is preferably a simple pin 9, so that advantageously the intended object of filling the trays with the correct bags by means of the device 1 can be achieved quickly and with minimal means merely by manipulating the spoon 7 and the pin 9. Following that, the arrival of the second row at the end of the path over the spoon 7 is detected by a sensor, whereupon the cycle is repeated and next rows of bags are folded in zigzag fashion in the tray until the control system C, after a print on a bag that has been introduced has been read by the reading device 5 and said information has been passed on to the control system C, delivers a command to the separating means 6 to break the series. The separating means 6 comprise cutting or pressure means, for example, controlled by the control system C, which function to separate the connection between two adjacent bags 2. After the remaining bags have been placed into the tray, in this way only those bags that belong together will end up in the tray 3. The fact is that when the reading device 5, after reading the information printed on a bag, concludes that the bag in question is intended for another entity, only those previously read bags that are intended for the previous entity will be deposited in the tray in question. After being printed with relevant information by labelling means (not explicitly shown), the tray 3 in question, which is filled with bags 2 thus selected, is usually carried out of the device 1 by conveying means 10 connected to the control system C. The aforesaid information generally comprises information that makes it possible to trace the executed process and the device 1 in question as well as, for example, identification data regarding contents and target group. Following that, one or more bags 3, which are usually filled to a
greater or smaller extent, are packaged individually and/or in groups and subsequently distributed and transported to the locations of the entities for which they are intended so as to deliver the medicines to the persons to whom they are to be administered.

[0016] Sensors, manipulators and motors connected to the software-controlled control system C are provided at several locations in the device 1 so as to have the above-explained method take place in an accurate manner and in the correct order in time. The control system C has a keyboard-controlled or touch-controlled screen 11 for controlling the device 1 and displaying status and processing data and possibly printing said data with a printer.

[0017] FIGS. 3 and 4 show a perspective view and a front view, respectively, of a device 1 by means of which a series of bags 2, usually interconnected in a long string, which are for example present in a collecting container or on a large roll or reel (not shown), are wound onto reels 12, which are filled with bags corresponding to each other whose contents are intended for the same aforementioned entity. First the specific embodiment of the device that comprises the reels 12 will now be explained in more detail, after which an embodiment of the device which is to some extent similar thereto, but which does not comprise the required reels 12, will be explained.

[0018] The device 1 comprises in-feed means, generally indicated at 4, for introducing the series or string of interconnected bags, which are filled with objects or medicines. The in-feed means 4 shown in FIGS. 3 and 4 are in this case configured as two driven conveyor belts 4-1 and 4-2 disposed one above the other, with a gap present therebetween, which are lined with a slightly elastic, resilient material on the outer sides, between which the bags are clamped and moved from the right to the left in the figure. Upon leaving the in-feed means 4, for example, the series of bags 2 passes a reading device 5, for example a bar code reader, and separating means 6, which are both connected to a general purpose computer control system C, which has already been explained in the foregoing.

[0019] After the introduction of the bags, pressure means 13 clamp one end of the bags 2 from the series down on a rotatably drivable reel 12 supplied by reel-supplying means 14, and the bags 2 are wound onto the reel 12. The pressure means 13, which are usually spring-loaded, prevent the leading portion of the series of bags from becoming detached from the reel 12. Said pressure means furthermore press down a label to be affixed to the last bag so that said last bag will not become detached from the other bags on the reel 12. Said winding up of the bags 2 continues until the control system C delivers a command to the separating means 6 to break the series after a print on an introduced bag has been read by the reading device 5 and said information has been passed on to the control system C. The separating means 6 comprise cutting or pressure means, for example, controlled by the control system C, which function to separate the connection between two adjacent bags 2. In this way only those individualised bags that belong together will end up on the reel in question after the remaining bags have been wound onto the reel. The fact is that when the reading device 5, after reading the information printed on the bag 2, concludes that the bag in question is intended for another entity, only those previously read bags that are intended for the previous entity will be wound onto the reel 12 in question.

[0020] The reel 12, which is provided with bags corresponding to each other 2, is preferably mounted on a movable rotation mechanism 15, so that, after the leading portion of the series of bags 2 has been clamped down on the reel 12, the reel 12 can be moved to the left, seen in FIG. 2, so as to clear the way for bags 2 to be wound onto the reel 12.

[0021] In the case of an embodiment as described above but without reels 12, the device 1 will not comprise any reel-supplying means 14, either, but it will comprise a rotatably drivable winding shaft, which, in FIGS. 3 and 4, may be regarded as being the element that is schematically indicated by numeral 12 in the device 1. The remaining part of the preceding description also applies to the embodiment without the reels, with this understanding that the control system C has been adapted accordingly.

[0022] In this case the end of the series of interconnected bags 2 is wound up to form the beginning of a roll upon being introduced, for example in that the leading part is inserted into a slot in the winding shaft 12, for example, or fixed or held down, at least temporarily, on the winding shaft. When the introduction of bags 2 by the conveyor belts 4-1, 4-2 is continued, the bags 2 are wound into a roll by the rotatably drivable winding shaft 12. The roll thus advantageously consists only of bags 12 in that case. If desired, pressure means, also indicated by numeral 13, may be provided again for holding the bags of the series down on the roll, in particular initially, upon further rotation of the roll. After the series of bags has been separated by the separating means 6, the roll is taken off the winding shaft 12 by suitable means, or the leading portion of the series of bags 2 is moved out of the slot in the winding shaft. Also in the embodiment shown in FIGS. 3 and 4 the bag 2 in question is carried out of the device 1 by conveying means 16 connected to the control device 1, usually after relevant information as mentioned above has been printed thereon by labelling means (not explicitly shown). Following that, one or more rolls or reels 12 thus filled to a greater or lesser extent are packaged individually and/or in groups and subsequently distributed and transported to the locations of the entities for which they are intended so as to deliver the medicines to the persons to whom they are to be administered.

[0023] Sensors, manipulators and motors connected to the software-controlled control system C are provided at several locations in the device 1 so as to have the above-explained method take place in an accurate manner and in the correct order in time. The control system C has a keyboard-controlled or touch-controlled screen 11 shown in FIGS. 1 and 2 for controlling the device 1 and displaying status and processing data and possibly printing said data with a printer.

1. A method wherein, after the introduction of a series of interconnected bags, a part of said series is arranged over a movable spoon, whereupon the spoon moves away, causing a first row of bags to fall into a tray, and the spoon is subsequently moved to a position for retaining said first row of bags in place in the tray, after which a cycle is carried out in which a movable carrier element guides the further arrangement of bags over the spoon until, upon arrival of the carrier element at the end of the second row, the spoon moves away from its position under the second row and is moved to a position for retaining the rows in place in the tray, after which the cycle is repeated until the series is broken, whereupon the tray containing the folded rows or bags is discharged.

2. A method according to claim 1, characterised in that said introduction and/or discharge takes place by means of a conveying system.
3. A method according to claim 1 or 2, characterised in that the series of interconnected bags is moved in a clamped position between driven conveyor belts upon being introduced.

4. A method according to any one of the claims 1-3, characterised in that the spoon, after being moved in position, presses down on the bags in the tray.

5. A method according to any one of the claims 1-4, characterised in that said breaking of the series is carried out by cutting, scissor or pressure means.

6. A method according to any one of the claims 1-5, characterised in that said carrier element comprises at least one pin.

7. A method according to any one of the claims 1-6, characterised in that the method is carried out by means of a control system which comprises a reading device for reading data printed on the bags, and which is arranged for discharging, on the basis of corresponding data of the same entity, such as the department, the floor level, the patient group, the person or the like, trays containing the bags filled with objects, such as medicines, intended for the entity in question.

8. A method according to any one of the claims 1-7, characterised in that prior to the discharge of the trays, relevant data, for example identification data, are printed on labels, which labels are affixed to the row or bags and/or to the tray.

9. A device for carrying out the method according to any one of the claims 1-8, characterised in that said device comprises:

- in-feed means for introducing a series of interconnected bags;
- a movable spoon for arranging a first row of bags from said series over the spoon upon introduction of the bags;
- tray-supplying means for supplying trays in which the rows of bags are to be deposited;
- a movable carrier element for guiding the rows of bags;
- separating means for breaking the series of bags being introduced;
- discharge means for delivering the trays filled with rows of bags;
- a control system comprising sensor control means for carrying out the method and a reading device for reading data printed on the bags, which control system is furthermore at least connected to the separating means for physically separating the rows of bags on the basis of printed corresponding data as read, which rows of bags are to be placed into various trays, which are each filled with bags corresponding to each other.

10. A device according to claim 9, characterised in that the device comprises labelling means connected to the control system for printing data relevant to the row of bags and/or the tray on labels before the trays are discharged.

11. A method wherein one end of a series of interconnected bags is rotated upon being introduced to form the beginning of a roll, and wherein the bags are wound into a roll by means of a rotatably drivable winding shaft when said introduction is continued, until the series is broken and the roll of bags is discharged.

12. A method according to claim 11, characterised in that use is made of a rotatably drivable reel, onto which the bags are wound.

13. A method according to claim 11 or 12, characterised in that the end of the series of interconnected bags being introduced is held down on or in the winding shaft or reel, and in that the bags are pressed onto the winding shaft or reel, if necessary, upon rotation thereof, and in that the roll or reel with the row of bags wound thereon is discharged after the series has been broken.

14. A method according to claim 12 or 13, characterised in that the rotatable reel is moved so as to clear the way for the bags to be wound onto the reel.

15. A method according to any one of the claims 11-14, characterised in that a part of a label is printed at least on the last bag on a reel or roll, whilst the other part is affixed to the bags wound into a roll or onto said reel.

16. A method according to any one of the claims 11-15, characterised in that data printed on the bags are read, and that rolls or reels with bags filled with objects, such as medicines, intended for the entity in question are discharged on the basis of corresponding data of the same entity, such as the department, the floor level, the patient group, the person or the like.

17. A method according to any one of the claims 11-16, characterised in that data relevant to the bags and/or the rolls or reel are printed on labels before the rolls or reels are discharged.

18. A device for carrying out the method according to any one of the claims 11-17, characterised in that the device comprises:

- in-feed means for introducing a series of interconnected bags;
- either reel-supplying means for supplying rotatably drivable reels, on which bags corresponding to each other are to be wound, or a rotatably drivable winding shaft, on which bags corresponding to each other are to be wound into a roll;
- pressure means for pressing down the bags while they are being wound into a roll or onto a reel;
- separating means for breaking the series of bags being introduced;
- discharge means for delivering the rolls or reels with bags;
- a control system comprising sensor control means for carrying out the method and a reading device for reading data printed on the bags, which control system is furthermore at least connected to the separating means for physically separating the bags on the rolls or reels, which are each filled with bags corresponding to each other, on the basis of printed corresponding data as read.

19. A device according to claim 18, characterised in that the rotatable reels or the winding shaft are mounted on a movable rotation mechanism.

20. A device according to claim 18 or 19, characterised in that the device comprises labelling means connected to the control system for printing inter alia data relevant to the bags and/or the rolls on labels before the rolls or reels are discharged.

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