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(54) **System and relative method for sorting a plurality of pillow bags containing salty products**

System und zugehöriges Verfahren zur Sortierung mehrerer Schlauchbeutel mit salzigen Produkten

Système et procédé associé pour trier une pluralité de sacs souples contenant des produits salés

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Description

Application field

[0001] The present invention relates to a system and a method for sorting a plurality of pillow bags containing salty products.

[0002] Particularly, the present invention relates to a system and a method for sorting at a case packer a plurality of pillow bags containing salty products produced by a bagging machine.

Description of the prior art

[0003] As it is known, the pillow bags are bags of the type having a symmetric upper and lower welding, and they are made by using a plastic film.

[0004] Such bags are intended to contain food products under protected conditions. The pillow bags on which the supplying device according to the present invention is intended to operate are pillow bags containing salty snacks preferably having a bulk density ranging between 0.02 and 0.15 Kg/liter.

[0005] An example of such pillow bags, which will be explicitly referred to herein below, is given by bags containing chips or the like.

[0006] By case packer is meant, in the context of the present invention, a machine that is able to form a box, usually made of cardboard, intended to contain a plurality of pillow bags.

[0007] The case packers intended to form a container, usually made of cardboard, intended to house pillow bags containing salty snacks have been long used in the salty snack production industry.

[0008] More and more often the case packers are arranged downstream of the bagging machines and connected therewith by a conveyor belt, so as to directly connect the bagging machine intended to the formation and filling of the pillow bags to the case packer intended to insert the pillow bags into the cardboard container being formed. In this manner, it is possible to avoid the use of operators who provide for manually transferring the pillow bags into the cardboard containers, with apparent advantages.

[0009] Particularly, the bagging machines are usually configured to supply the pillow bags that have been obtained and containing the salty snacks to a conveyor belt.

[0010] The pillow bags are individually supplied to the conveyor belt (one bag at a time) so as to obtain a single ordered row of bags.

[0011] Each bag is oriented parallel to the other ones, with the front portion thereof (carrying images and information regarding the bag contents) in contact with the rear portion (the portion opposite the front one) of the bag preceding it in the row.

[0012] The case packers usually provide for a forming line (or track), along which the container forming stations are arranged, which line extends along a rectilinear path. The insertion of the bags in the forming line occurs perpendicularly thereto, so that the pillow bags are inserted into the container being formed.

[0013] It shall be apparent that the pillow bags have to be inserted into the cardboard containers in a preordered manner, i.e., orienting each pillow bag in a predetermined manner with respect to both the container and the other bags.

[0014] In particular, each type of container requires a specific ordering of the pillow bags.

[0015] In fact, it shall be noticed that, exactly due to the nature of the products to be inserted into the containers being formed, it is not possible to adopt pushing devices or flow deflectors (borrowed by the field of the casing in of solid and evenly-shaped packagings) to re-orient the pillow bags. In fact, too vigorous mechanical actions onto the pillow bags would risk to damage the same bags or to damage the salty snacks having a low bulk density contained therein. Furthermore, the bulging shape of the pillow bags makes controlling the spatial orientation thereof very difficult, which is the reason the bagging machine supplies a conveyor belt with an ordered row of pillow bags in mutual contact. Furthermore, it shall be noticed that the bagging machines have variable manufacturing rates of the pillow bags, i.e., the manufacturing thereof is not constant over time.

[0016] This may involve problems relating to the complete filling of the containers. In fact, each container is designed to contain a preset number of pillow bags, for example, six, eight, ten, etc. Since the containers move along a support plane at a predetermined speed, there is the tangible risk that some of such containers may contain a number of pillow bags less than the value that had been set when designing them.

[0017] This involves a delivery to the supply chain, whether it is a retail or a large-scale chain, of unfinished containers. In such a situation, the problem originates of the reliability in carrying out the container filling operation with the proper number of pillow bags, an economical damage to the manufacturer of salty products, to the supply chain, as well as a dissatisfaction of the clientele. Furthermore, there is also the risk that not all the produced bags are actually put into the containers. This occurs particularly when the manufacturing rate is particularly high. In this scenery there is the possibility that the operator is not able to maintain the manufacturing rate of the case packer; therefore, some bags fall out of the line.

[0018] In order to solve such problems, it is usually resorted to employ additional operators so as to ensure that the containers get the actual number of expected bags and, moreover, that the bags that possibly have not been put into the containers are picked up again and inserted into a still unfinished container.

[0019] US 2006 090424 A1 discloses a robotic packer for collating products.

SUMMARY OF THE INVENTION

[0020] In this context, the technical task underlying the present invention is to propose a system and relative method for sorting pillow bags containing salty products at a case packer which solves the above-mentioned drawbacks of the prior art. Particularly, it is the object of the present invention to provide a system for sorting the pillow bags containing salty products at a case packer capable of ensuring the proper filling of the containers independently from the case packer manufacturing rate.

[0021] The indicated technical task and the specified objects are substantially achieved by a system and relative method for sorting pillow bags containing salty products at a case packer, comprising the technical characteristics set forth in one or more of the appended claims.

[0022] By virtue of the present invention, it is possible to implement a system capable of avoiding that a number of pillow bags less than that expected during the designing is inserted into the containers, and at the same time that no recollecting operations of pillow bags that are not immediately used to fill the containers are necessary.

BRIEF DESCRIPTION OF THE DRAWING

[0023] Further characteristics and advantages of the present invention will be more clearly apparent from the illustrative, hence non-limiting, description of a preferred, but not exclusive, embodiment of a system for sorting pillow bags containing salty products at a case packer, as illustrated in the appended drawing of Fig. 1, in which a system for sorting pillow bags containing salty products at a case packer according to the present invention is schematically shown.

DETAILED DESCRIPTION

[0024] A system for sorting pillow bags containing salty products at a case packer in accordance with the present invention has been generally indicated by the number 1 in Fig. 1.

[0025] The system 1 comprises a loading station 2 to which a plurality of pillow bags 100, 101, ..., 100x, for example, bags of chips (which will be explicitly referred to herein below,) is sent, and a ordering station in which the bags 100, ..., 100x are ordered in a predetermined amount.

[0026] The loading station 2 is arranged at a supplying line of bags that come, for example, from a bagging machine (not shown), and it provides for a loading position at which the pillow bags are supplied, and an unloading position, opposite the loading position.

[0027] The ordering station 3 provides for a loading position that is at the loading station 2, and an unloading position, opposite the loading position, which is arranged at a case packer (not shown).

[0028] Particularly, the system 1 provides for:

- the loading station 2 comprises a conveyor belt 4 extending along a first horizontal lying plane X having a predetermined linear length L; such loading station 2 comprises first motor means 2A configured to move the conveyor belt 4 with an advancement speed v1 so as to transport the pillow bags 100, 101, ..., 100x from the loading position to the unloading position; the motor means 2A comprise electric motors meshed with the conveyor belt 4 according to known, hence not described, techniques;
- the ordering station 3 comprises a support plane 5 extending along a second horizontal lying plane X' and is intended to receive and support a plurality of pillow bags 100, 101, ..., 100x; such ordering station 3 comprises motor means 3A configured to move the support plane 5 with an advancement speed v2; the motor means 3A comprise electric motors meshed with the support plane 5 according to known, hence not described, techniques.

[0029] According to an aspect, both the conveyor belt 4 of the loading station 2 and the support plane 5 of the ordering station 3 provide at least one rotation of the conveyor belt 4 or the support plane 5, about an axis perpendicular to said lying plane, by at least 90°.

[0030] It is worth noticing that the conveyor belt 4 and the support plane 5 are movable along the same directions.

[0031] Preferably, the conveyor belt 4 and the support plane 5 extend along parallel directions, i.e., the lying plane X and X' are mutually parallel.

[0032] It is worth noticing that the bags 100, 101, ..., 100x reach the conveyor belt 4 according to an ordered row, i.e., a pillow bag after another with a spacing interval (or, similarly, a time interval) between the various pillow bags that can be constant or uneven. For example, the interval between the first bag and the second bag can be the same as or different from the interval between the second bag and the third bag, and so on.

[0033] Particularly, the support plane 5 of the ordering station 3 is divided by a plurality of panels 6, 7 which turn out to be active on such support plane 5 to define a plurality of containing spaces 8 (or containers), each of which being intended to contain, i.e., to have a useful volume, suitable for a predetermined plurality of pillow bags 100, 101, ..., 100x, for example of six, eight, or ten pillow bags. According to an aspect, each containing space 8 is defined by at least two of the panels 6 that are stationary with respect to the support plane 5 so as to identify side containment edges for the same pillow bags. On the other hand, some of the panels are movable between a containment condition, in which they engage said support plane 5 and define transversal containment edges with respect to the side containment edges 6, and a supine condition, in which they do not engage the support plane 5.

[0034] It is worth noticing that, once the containing space 8 has been completed with the expected number

of pillow bags, suitable mechanisms (not shown) configured to obtain a packaging, for example made of cardboard, are provided for, which are capable of collecting the plurality of pillow bags that are present in the containing space 8.

[0035] The system 1 comprises robotic gripping means 9 configured to grasp a pillow bag at a time from the ordered row of pillow bags 100, 101, ..., 100x present on the conveyor belt 4 and to put it into a containing space 8 of the support plane 5 of the ordering unit 3.

[0036] According to a preferred aspect, the robotic gripping means 9 comprise an electrically-actuated robotic arm provided with gripping members of the pneumatic type to grasp a pillow bag without damaging the contents thereof and to put it into the containing space 8.

[0037] As regards the containing space 8, it shall be noticed that the containing space 8 that is first created on the support plane 5 is filled first, by the robotic gripping means 9. In other terms, the containing spaces are filled by filling the first space created by the plurality of panels 6, 7.

[0038] The system comprises means 10 for detecting the instant of passage of each bag of the row of pillow bags 100, 101, ..., 100x with reference to the conveyor belt 4.

[0039] Particularly, the detecting means 10 are configured to generate a passage signal S1 relative to each pillow bag 100, 101, ..., 100x detected by the detecting means 10.

[0040] Such a passage signal S1 is representative of the time instant at which the pillow bag has passed in the reference axis of the detecting means 10.

[0041] It is worth noticing that the detecting means 10 are associated with the conveyor belt 4 so as to intercept the pillow bags transiting on such conveyor belt 4.

[0042] According to an aspect, the detecting means comprise a photocell or a similar device for functions that are known in the operation thereof to those skilled in the art; therefore, they are not described herein.

[0043] The system 1 comprises processing and control means 11 in signal communication with the detecting means 10 and electrically connected with the gripping means 9.

[0044] Preferably, the processing and control means 14 are remote with respect to the loading station 2 and with respect to the ordering station 3. Particularly, the processing and control means 11 are housed, for example, in a closet or containing case.

[0045] The processing and control means 11 comprise a firmware, i.e., a program, i.e., a sequence of instructions, directly integrated in the processing and control means 11, for:

- processing the passage signal S1 as a function of the advancement speed v1 so as to generate a position signal S2 which identifies the position that each pillow bag 100, 101, ..., 100x takes along the lying plane with a length L of the conveyor belt 4;
- generating a driving signal S3 configured to change the advancement speed v2 of the support plane 5 as a function of the position signal S2 when the gripping means withdraw a pillow bag.

[0046] Preferably, the advancement speed v1 of the conveyor belt 4 is constant, while the second advancement speed v2 is variable as a function of the position signal S2.

[0047] According to an aspect, the processing and driving means 11 comprise a memory, a processing unit, and one or more of data input/output boards.

[0048] For example, the value of the advancement speed v1 of the conveyor belt 4 and the length L thereof is stored in such memory.

[0049] Particularly, the processing and driving means 11 receive the passage signal S1 which is generated by the detecting means 10, and, with such signal S1 and the value of the advancement speed v1, which is preferably constant, being known, as well as the length L of the conveyor belt 4, and they identify the position of each pillow bag 100, 101, ..., 100x (signal S2) with respect to the length L of the same conveyor belt.

[0050] In order to determine the spatial position of each bag 100, 101, ..., 100x, it is provided to take, as an initial reference for the length L, the position where the detecting means 10 are arranged.

[0051] It is worth noticing that the determination of the spatial position of each individual pillow bag is facilitated by the fact that the pillow bags are arranged in a row.

[0052] Preferably, the detecting means 10 are arranged in the loading position of the conveyor belt 4, i.e., in the portion of the conveyor belt 4 at which the pillow bags 100, 101, ..., 100x are received from the bagging machine.

[0053] According to a preferred aspect, the origin point, from which the calculation of the linear length L of the conveyor belt 4 starts, matches with the point at which there is the association of the detecting means 10 with the same conveyor belt. Since the width l of the conveyor belt 4 is substantially equal to the width of a pillow bag 100, the signal S2 actually represents the position with respect to the lying axis X of the conveyor belt 4.

[0054] Therefore, the spatial position of each bag 100, 101, ..., 100x that is present on the conveyor belt 4 being known, as the time changes, the processing and driving means 11 process the driving signal S3 when the gripping means 9 take one of the pillow bags in order to put it into the first one of the containers 8 present on the support plane 5.

[0055] Therefore, the gripping position of each bag 100, 101, ..., 100x along the lying plane of the conveyor belt 4 being known, the driving signal S3 is generated and sent to the motor means 3A of the ordering station 3.

[0056] Such a driving signal S3 is configured to change the value of the advancement speed v2 so as to change the advancement speed of the support plane 5, hence of the containers 8.

[0057] Advantageously, it is possible to change the advancement speed of the support plane 5 as a function of the bagging machine manufacturing rate.

[0058] In fact, the driving signal S3 is generated as a function of the position where (i.e., the spatial coordinate in the abscissa along the horizontal lying plane X of the conveyor belt 4) each pillow bag 100, 101, ..., 100x on the conveyor belt 4 is withdrawn by the gripping means 9.

[0059] In a preferred aspect of the present description, the driving signal S3 is configured to increase the second advancement speed v2 when the position signal S2 is indicative of a position (i.e., the spatial coordinate in the abscissa 1 along the horizontal lying plane X of the conveyor belt 4) downstream of a reference point Pr, while the driving signal S3 is configured to decrease the second advancement speed v2 when the position signal S2 is indicative of a position (i.e., of a withdrawing point by the gripping means 9) upstream of the reference point of reference Pr.

[0060] It is worth noticing that the reference point Pr indicates the spatial coordinate along the horizontal lying plane X of the conveyor belt 4, i.e., the coordinate in the abscissa with respect to the origin, which is arranged at the point where the detecting means 10 are located.

[0061] For example, the reference point Pr can be located in the middle of the length 2 L of the lying plane of the conveyor belt 4, i.e., Pr has as its coordinate in the abscissae a value equal to half the linear length L of the conveyor belt 4.

[0062] In such a scenery, if the withdrawing point of a pillow bag 100, 101, ..., 100x is upstream (i.e., spatially before) of the reference point Pr, where Pr is equal to *U2,* then the processing and driving means generate the driving signal S3 so as to decrease the second advancement speed v2 of the support plane 5, while if the withdrawing point of a pillow bag 100, 101, ..., 100x is downstream (i.e., spatially after) of the reference point Pr, then the processing and driving means generate the driving signal S3 so as to increase the second advancement speed v2 of the support plane 5.

[0063] Such increase/decrease of the advancement speed v2 ensures that all the pillow bags produced by the case packer are actually grasped and put into the container 8.

[0064] Preferably, the gripping means 9 deposit the pillow bag into the container 8, which is free to receive it. Such a container 8 is the one that is the nearest to the unloading position located at the case packer.

[0065] In order to ensure that the containers 8 are completed with the predetermined number of expected pillow bags (for example six, eight, ten, etc.), the processing and driving means 11 store in a memory portion thereof, beside to data relating to the advancement speed v1, the length L of the conveyor belt 4, the firmware, as well as the position of the reference point Pr, also the number of pillow bags already deposited into a specific container 8. Particularly, the amount of pillow bags that each containing space 8 may house being known, and being provided that the gripping means 9 continue to withdraw and deposit the pillow bags in the same containing space 8 until reaching the maximum capacity value of the containing space 8.

[0066] To this aim, a memory register is provided, into which it is tracked, by an incremental counter, of how many pillow bags 100, 101, ..., 100x have been already deposited into a specific containing space 8.

[0067] In other terms, the value representative of the maximum amount of pillow bags housable in the containing space 8 being known, for example, six, eight, or ten, it is provided for to track, for example by the updatable counter, the number of pillow bags put into an individual containing space 8. The gripping means will continue to deposit the pillow bags in such individual containing space 8 until when the number of pillow bags transported in an individual containing space 8 is less than or equal to the value representative of the maximum amount of pillow bags housable in the containing space 8. According to an aspect, the advancement speed v2 of the support plane 5 can be varied also as a function of the amount of pillow bags (for example, six, eight, or ten, etc.) housable in each container 8.

[0068] It shall be apparent that those skilled in the art, in order to meet contingent, specific needs, will be able to make a number of modifications and variations to the system and method for sorting a plurality of pillow bags 100, 101, ..., 100x containing salty products described above, all of which anyhow fall within the protection scope as defined by the following claims.

Claims

1. A system (1) for sorting a plurality of pillow bags (100, 101, ..., 100x) containing salty products, comprising:

- a loading station (2) comprising a conveyor belt (4) extending by a predetermined length (L) along a first horizontal lying plane (X), first motor means (2A) to move said conveyor belt (4) with a first advancement speed (v1) so as to transport a row of pillow bags (100, 101, ..., 100x) from a loading position to an unloading position;
- an ordering station (3) comprising a support plane (5) extending along a second horizontal lying plane (X') and intended to receive and support a plurality of pillow bags (100, 101, ..., 100x), second motor means (3A) to move said support plane (5) with a second advancement speed (v2) from a loading position to an unloading position;
- a plurality of panels (6,7) active on said support plane (5) to define a plurality of containing spaces (8), each of which being intended to contain a predetermined plurality of pillow bags (100, 101, ..., 100x);
- robotic gripping means (9) configured to take

a pillow bag at a time from said row of pillow bags (100, 101, ..., 100x) present on said conveyor belt (4) and to put it into a containing space (8) defined on said support plane (5);

- detecting means (10) of the spatial position of each bag of said row of pillow bags (100, 101, ..., 100x), said detecting means (10) being associated to said conveyor belt (4) in the proximity of said loading position and configured to generate a passage signal (S1) upon the passage of each pillow bag (100, 101, ..., 100x) present on said conveyor belt (4), said passage signal (s1) being representative of the time instant at which said pillow bag (100, 101, ..., 100x) has passed;
- processing and driving means (11) in signal communication with said detecting means (10) and electrically connected with said gripping means (9) and with said second motor means (3A), said processing and driving means (11) comprising a firmware configured for:
- processing said passage signal (S1) as a function of said first advancement speed (v1) and said length (L) of said conveyor belt (4) so as to generate a position signal (S2) identifying the position taken by each of said pillow bag (100, 101, ..., 100x) with respect to said conveyor belt (4), and
- generating a driving signal (S3) to drive said second motor means (3A) to change said second advancement speed (v2) as a function of said position signal (S2).

2. The system according to claim 1, wherein said driving signal (S3) is configured to increase said second advancement speed (v2) when said position signal (S2) is indicative of a position downstream of a reference axis (Pr).

3. The system according to claim 1, wherein said driving signal (S3) is configured to decrease said second advancement speed (v2) when said position signal (S2) is indicative of a position upstream of a reference axis (Pr).

4. The system according to any of the preceding claims, wherein said processing and driving means (11) comprise a counter updatable as a function of the number of pillow bags (100, 101, ..., 100x) withdrawn and put into a containing space (8)

5. The system according to any of the preceding claims, wherein each containing space (8) is defined by at least two (6) of said panels (6,7) which are stationary with respect to said support plane (5) so as to identify side containment edges for said pillow bags (100, 101, ..., 100x) and some of said panels (7) being movable between a containment condition, in which they engage said support plane and define transversal containment edges with respect to said side containment edges, and a supine condition, in which they do not engage said support plane (5).

6. The system according to claim 1, wherein said conveyor belt (4) and/or said support plane (5) provide for the passage between the loading position and the unloading position, and vice versa, by a rotation of said conveyor belt (4) and/or said support plane (5), about an axis perpendicular to said lying plane (X, X'), by at least 90°.

7. The system according to claim 1, wherein said gripping means (9) comprise an electrically-actuated robotic arm having pneumatic gripping means.

8. The system according to claim 1, wherein said detecting means (10) comprise a photocell arranged at said loading position of said conveyor belt (4).

9. The system according to claim 1, wherein said processing and driving means (11) comprise a memory, a microprocessor, and one or more data input/output boards configured to interface with said first and/or second motor means (2A, 3A), said gripping means (9) and said detecting means (10), said memory being in signal communication with said microprocessor, said memory having a memory portion intended to permanently store at least said firmware, said value of said first speed (v1), said length (L) of said conveyor belt (4), and the value contained in said updatable counter.

10. The system according to claim 1, wherein said conveyor belt (4) and said support plane (5) are movable along the same directions.

11. The system according to claim 1, wherein said conveyor belt (4) and said support plane (5) extend along parallel directions.

12. Method for sorting a plurality of pillow bags (100, 101, ..., 100x) containing salty products, comprising the steps of:

- detecting a passage instant (S1) of each pillow bag of a row of pillow bags (100, 101, ..., 100x) supported by a conveyor belt (4) extending by a predetermined length (L) along a first horizontal lying plane (X), said conveyor belt (4) being mobile at a first constant advancement speed (v1);
- withdrawing a pillow bag at a time by determining the spatial position (S2) thereof as a function of the passage instant (S1), of said first constant advancement speed (v1) and predetermined length (L) of said conveyor belt (4);
- depositing said withdrawn pillow bag into a con-

taining space (8) defined on a support plane (5) that is movable at a second advancement speed (v2);

- changing said second advancement speed (v2) of said support plane (5) as a function of said spatial position for withdrawing said pillow bag with respect to a reference axis (Pr).

13. The method according to claim 12, wherein said step of changing said second advancement speed (v2) of said support plane (5) provides for increasing said second advancement speed (v2) when said spatial position for withdrawing said pillow bag is downstream of said reference axis (Pr).

14. The method according to claim 12, wherein said step of changing said second advancement speed (v2) of said support plane (5) provides for decreasing said second advancement speed (v2) when said spatial position for withdrawing said pillow bag is upstream of the reference axis (Pr).

15. The method according to claim 12, comprising the steps of:

- acquiring a value representative of the predetermined plurality of bags of pillow bags housable in said containing space (8);
- tracking the number of pillow bags put into an individual containing space (8);
- repeating the steps of withdrawing said pillow bag at a time by determining the spatial position (S2) thereof until when said number of pillow bags transported in an individual containing space (8) is less than or equal to said value representative of the maximum amount of pillow bags housable in said containing space (8).

Patentansprüche

1. System (1) zum Sortieren einer Vielzahl von Kissenbeuteln (100, 101, ..., 100x), die salzige Produkte enthalten, umfassend:

- eine Beladestation (2), umfassend ein Transportband (4), das sich über eine vorgegebene Länge (L) längs einer ersten, horizontalen Liegeebene (X) erstreckt, erste Motormittel (2A), um das Transportband (4) mit einer ersten Vorschubgeschwindigkeit (v1) zu bewegen, um eine Reihe von Kissenbeuteln (100, 101, ..., 100x) von einer Beladeposition zu einer Entladeposition zu transportieren;
- eine Ordnungsstation (3), umfassend eine Auflageebene (5), die sich längs einer zweiten, horizontalen Liegeebene (X') erstreckt und dazu dient, eine Vielzahl von Kissenbeuteln (100, 101, ..., 100x) aufzunehmen und zu tragen, zweite Motormittel (3A), um die Auflageebene (5) mit einer zweiten Vorschubgeschwindigkeit (v2) von einer Beladeposition zu einer Entladeposition zu bewegen;
- eine Vielzahl von auf die Auflageebene (5) wirkenden Platten (6, 7), um eine Vielzahl von Aufnahmeräumen (8) zu definieren, die jeweils dazu dienen, eine vorgegebene Vielzahl von Kissenbeuteln (100, 101, ..., 100x) aufzunehmen;
- roboterartige Greifmittel (9), die dazu ausgebildet sind, einen Kissenbeutel einzeln aus der Reihe der auf dem Transportband (4) befindlichen Kissenbeutel (100, 101, ..., 100x) aufzunehmen und ihn in einen auf der Auflageebene (5) definierten Aufnahmeraum (8) zu legen;
- Erfassungsmittel (10) zum Erfassen der Raumposition von jedem Beutel in der Reihe von Kissenbeuteln (100, 101, ..., 100x), wobei die Erfassungsmittel (10) mit dem Transportband (4) in der Nähe der Beladeposition verbunden und entsprechend ausgebildet sind, um ein Durchgangssignal (S1) beim Durchgang von jedem auf dem Transportband (4) befindlichen Kissenbeutels (100, 101, ..., 100x) zu erzeugen, wobei das Durchgangssignal (S1) repräsentativ für den Zeitpunkt ist, an dem der Kissenbeutel (100, 101, ..., 100x) durchgegangen ist;
- Verarbeitungs- und Antriebsmittel (11) in Signalverbindung mit den Erfassungsmitteln (10) und elektrisch verbunden mit den Greifmitteln (9) und mit den zweiten Motormitteln (3A), wobei die Verarbeitungs- und Antriebsmittel (11) eine Firmware umfassen, die ausgebildet ist zum:
- Verarbeiten des Durchgangssignals (S1) in Abhängigkeit von der ersten Vorschubgeschwindigkeit (v1) und der Länge (L) des Transportbands (4), um ein Positionssignal (S2) zu erzeugen, das die Position identifiziert, die jeder Kissenbeutel (100, 101, ..., 100x) bezogen auf das Transportband (4) einnimmt, und
- Erzeugen eines Ansteuersignals (S3), um die zweiten Motormittel (3A) anzusteuern, um die zweite Vorschubgeschwindigkeit (v2) in Abhängigkeit von dem Positionssignal (S2) zu ändern.

2. System nach Anspruch 1, wobei das Ansteuersignal (S3) ausgebildet ist, um die zweite Vorschubgeschwindigkeit (v2) zu erhöhen, wenn das Positionssignal (S2) auf eine Position stromabwärts einer Bezugsachse (Pr) hinweist.

3. System nach Anspruch 1, wobei das Ansteuersignal (S3) ausgebildet ist, um die zweite Vorschubgeschwindigkeit (v2) zu vermindern, wenn das Positionssignal (S2) auf eine Position stromaufwärts einer Bezugsachse (Pr) hinweist.

4. System nach einem beliebigen der vorstehenden Ansprüche, wobei die Verarbeitungs- und Antriebsmittel (11) einen aktualisierbaren Zähler in Abhängigkeit von der Zahl der Kissenbeutel (100, 101, ..., 100x) umfasst, die entnommen und in den Aufnahmeraum (8) gelegt wurden.

5. System nach einem beliebigen der vorstehenden Ansprüche, wobei jeder Aufnahmeraum (8) durch mindestens zwei (6) der Platten (6, 7) definiert ist, die feststehend mit der Auflageebene (5) sind, um seitliche Eingrenzungskanten für die Kissenbeutel (100, 101, ..., 100x) zu definieren, und einige der Platten (7) zwischen einer Eingrenzungslage, in der diese die Auflageebene in Eingriff nehmen und Quereingrenzungskanten bezogen auf die seitlichen Eingrenzungskanten definieren, und einer Rückenlage bewegbar sind, in der diese die Auflageebene (5) nicht in Eingriff nehmen.

6. System nach Anspruch 1, wobei das Transportband (4) und/oder die Auflageebene (5) für den Durchgang zwischen der Beladeposition und der Abladeposition und umgekehrt durch eine Rotation des Transportbands (4) und/oder der Auflageebene (5) um eine senkrecht zur Liegeebene (X, X') stehende Achse von mindestens 90°sorgen.

7. System nach Anspruch 1, wobei die Greifmittel (9) einen elektrisch betätigten Roboterarm mit pneumatischen Greifmitteln umfassen.

8. System nach Anspruch 1, wobei die Erfassungsmittel (10) eine Fotozelle umfassen, die an der Beladeposition des Transportbands (4) angeordnet ist.

9. System nach Anspruch 1, wobei die Verarbeitungs- und Antriebsmittel (11) einen Speicher, einen Mikroprozessor und eine oder mehrere Dateneingabe-/Datenausgabevorrichtungen umfassen, die ausgebildet sind, um mit den ersten und/oder zweiten Motormitteln (2A, 3A), den Greifmitteln (9) und den Erfassungsmitteln (10) zusammenzuwirken, wobei der Speicher in Signalverbindung mit dem Mikroprozessor steht, wobei der Speicher einen Speicherbereich aufweist, der dazu dient, mindestens die Firmware, die Werte der ersten Geschwindigkeit (v1), die Länge (L) des Transportbands (4) und den im aktualisierbaren Zähler enthaltenen Wert dauerhaft zu speichern.

10. System nach Anspruch 1, wobei das Transportband (4) und die Auflageebene (5) entlang denselben Richtungen bewegbar sind.

11. System nach Anspruch 1, wobei das Transportband (4) und die Auflageebene (5) sich in parallele Richtungen erstrecken.

12. Verfahren zum Sortieren einer Vielzahl von Kissenbeuteln (100, 101, ..., 100x), die salzige Produkte enthalten, umfassend folgende Schritte:

- Erfassen eines Durchgangszeitpunkts (S1) von jedem Kissenbeutel in einer Reihe von Kissenbeuteln (100, 101, ..., 100x), die von einem ersten Transportband (4) getragen werden, das sich über eine vorgegebene Länge (L) längs einer ersten horizontalen Liegeebene (X) erstreckt, wobei das Transportband (4) mit einer ersten konstanten Vorschubgeschwindigkeit (v1) bewegbar ist;
- Entnehmen jeweils eines Kissenbeutels durch Feststellen seiner Raumposition (S2) in Abhängigkeit vom Durchgangszeitpunkt (S1), von der ersten konstanten Vorschubgeschwindigkeit (v1) und der vorgegebenen Länge (L) des Transportbands (4);
- Ablegen des entnommenen Kissenbeutels in einen Aufnahmeraum (8), der auf einer Auflageebene (5) definiert ist, die mit einer zweiten Vorschubgeschwindigkeit (v2) bewegbar ist;
- Ändern der zweiten Vorschubgeschwindigkeit (v2) der Auflageebene (5) in Abhängigkeit von der Raumposition zum Entnehmen des Kissenbeutels bezogen auf eine Bezugsachse (Pr).

13. Verfahren nach Anspruch 12, wobei der Schritt des Änderns der zweiten Vorschubgeschwindigkeit (v2) der Auflageebene (5) eine Erhöhung der zweiten Vorschubgeschwindigkeit (v2) vorsieht, wenn die Raumposition zur Entnahme des Kissenbeutels sich stromabwärts der Bezugsachse (Pr) befindet.

14. Verfahren nach Anspruch 12, wobei der Schritt des Änderns der zweiten Vorschubgeschwindigkeit (v2) der Auflageebene (5) eine Verminderung der zweiten Vorschubgeschwindigkeit (v2) vorsieht, wenn die Raumposition zur Entnahme des Kissenbeutels sich stromaufwärts der Bezugsachse (Pr) befindet.

15. Verfahren nach Anspruch 12, umfassend folgende Schritte:

- Ermitteln eines Werts, der repräsentativ für die vorgegebene Vielzahl von Beuteln von Kissenbeuteln ist, die in dem Aufnahmeraum (8) untergebracht werden können;
- Überwachen der Zahl von Kissenbeuteln, die in einen individuellen Aufnahmeraum (8) gelegt wurden;
- Wiederholen der Schritte des Entnehmens des einzelnen Kissenbeutels durch Feststellen seiner Raumposition (S2) bis die Zahl der Kissenbeutel, die in einen individuellen Aufnahmeraum (8) befördert wurden, kleiner oder gleich dem Wert ist, der repräsentativ für die Höchstmenge

an Kissenbeuteln ist, die in dem Aufnahmeraum (8) untergebracht werden können.

Revendications

1. Système (1) pour le triage d'une pluralité de sachets en forme de coussin (100, 101, ..., 100x) contenant des produits salés, comprenant :

   - une station de chargement (2) comprenant une bande transporteuse (4) s'étendant sur une longueur prédéterminée (L) suivant un premier plan d'agencement horizontal (X), des premiers moyens de motorisation (2A) pour déplacer ladite bande transporteuse (4) avec une première vitesse d'avancement (v1) de manière à transporter une rangée de sachets en forme de coussin (100, 101, ..., 100x) d'une position de chargement à une position de déchargement ;
   - une station de classement (3) comprenant un plan de support (5) s'étendant suivant un deuxième plan d'agencement horizontal (X') et destiné à recevoir et supporter une pluralité de sachets en forme de coussin (100, 101, ..., 100x), des deuxièmes moyens de motorisation (3A) pour déplacer ledit plan de support (5) avec une deuxième vitesse d'avancement (v2) d'une position de chargement à une position de déchargement ;
   - une pluralité de panneaux (6, 7) active sur ledit plan de support (5) pour définir une pluralité d'espaces de logement (8), chacun desquels étant destiné à contenir une pluralité prédéterminée de sachets en forme de coussin (100, 101, ..., 100x) ;
   - des moyens de préhension robotisés (9) configurés pour prélever un sachet en forme de coussin à la fois de ladite rangée de sachets en forme de coussin (100, 101, ..., 100x) présente sur ladite bande transporteuse (4) et pour le placer dans un espace de logement (8) défini sur ledit plan de support (5) ;
   - des moyens de détection (10) de la position spatiale de chaque sachet de ladite rangée de sachets en forme de coussin (100, 101, ..., 100x), lesdits moyens de détection (10) étant associés à ladite bande transporteuse (4) à proximité de ladite position de chargement et configurés pour générer un signal de passage (S1) lors du passage de chaque sachet en forme de coussin (100, 101, ..., 100x) présent sur ladite bande transporteuse (4), ledit signal de passage (s1) étant représentatif de l'instant auquel ledit sachet en forme de coussin (100, 101, ..., 100x) est passé ;
   - des moyens de traitement et de commande (11) en communication de signal avec lesdits moyens de détection (10) et connectés électriquement avec lesdits moyens de préhension (9) et avec lesdits deuxièmes moyens de motorisation (3A), lesdits moyens de traitement et de commande (11) comprenant un microprogramme configuré pour :
     - traiter ledit signal de passage (S1) comme une fonction de ladite première vitesse d'avancement (v1) et de ladite longueur (L) de ladite bande transporteuse (4) de manière à générer un signal de position (S2) identifiant la position prise par chacun dudit sachet en forme de coussin (100, 101, ..., 100x) par rapport à ladite bande transporteuse (4), et
     - générer un signal de pilotage (S3) pour piloter lesdits deuxièmes moyens de motorisation (3A) pour changer ladite deuxième vitesse d'avancement (v2) comme une fonction dudit signal de position (S2).

2. Système selon la revendication 1, dans lequel ledit signal de pilotage (S3) est configuré pour augmenter ladite deuxième vitesse d'avancement (v2) quand ledit signal de position (S2) est indicatif d'une position en aval d'un axe de référence (Pr).

3. Système selon la revendication 1, dans lequel ledit signal de pilotage (S3) est configuré pour diminuer ladite deuxième vitesse d'avancement (v2) quand ledit signal de position (S2) est indicatif d'une position en amont d'un axe de référence (Pr).

4. Système selon l'une quelconque des revendications précédentes, dans lequel lesdits moyens de traitement et de commande (11) comprennent un compteur actualisable comme une fonction du nombre de sachets en forme de coussin (100, 101, ..., 100x) retirés et placés dans un espace de logement (8).

5. Système selon l'une quelconque des revendications précédentes, dans lequel chaque espace de logement (8) est défini par au moins deux (6) desdits panneaux (6, 7) qui sont immobiles par rapport audit plan de support (5) de manière à identifier des bords latéraux de confinement pour lesdits sachets en forme de coussin (100, 101, ..., 100x) et certains desdits panneaux (7) étant mobiles entre une condition de confinement, dans laquelle ils engagent ledit plan de support et définissent des bords de confinement transversaux par rapport auxdits bords de confinement latéraux, et une condition sur le dos, dans laquelle ils n'engagent pas ledit plan de support (5).

6. Système selon la revendication 1, dans lequel ladite bande transporteuse (4) et/ou ledit plan de support (5) fournissent le passage entre la position de chargement et la position de déchargement, et inversement, par une rotation de ladite bande transporteuse

(4) et/ou dudit plan de support (5), autour d'un axe perpendiculaire audit plan d'agencement (X, X'), d'au moins 90°.

7. Système selon la revendication 1, dans lequel lesdits moyens de préhension (9) comprennent un bras robotisé actionné électriquement ayant des moyens de préhension pneumatiques.

8. Système selon la revendication 1, dans lequel lesdits moyens de détection (10) comprennent une photocellule agencée au niveau de ladite position de chargement de ladite bande transporteuse (4).

9. Système selon la revendication 1, dans lequel lesdits moyens de traitement et de commande (11) comprennent une mémoire, un microprocesseur et une ou plusieurs cartes d'entrées/sorties de données configurées pour s'interfacer avec lesdits premiers et/ou deuxièmes moyens de motorisation (2A, 3A), lesdits moyens de préhension (9) et lesdits moyens de détection (10), ladite mémoire étant en communication de signal avec ledit microprocesseur, ladite mémoire ayant une portion de mémoire destinée à stocker de manière permanente au moins ledit microprogramme, ladite valeur de ladite première vitesse (v1), ladite longueur (L) de ladite bande transporteuse (4) et la valeur contenue dans ledit compteur actualisable.

10. Système selon la revendication 1, dans lequel ladite bande transporteuse (4) et ledit plan de support (5) sont mobiles suivant les mêmes directions.

11. Système selon la revendication 1, dans lequel ladite bande transporteuse (4) et ledit plan de support (5) s'étendent suivant des directions parallèles.

12. Procédé pour le triage d'une pluralité de sachets en forme de coussin (100, 101, ..., 100x) contenant des produits salés, comprenant les étapes suivantes :

- la détection d'un instant de passage (S1) de chaque sachet en forme de coussin d'une rangée de sachets en forme de coussin (100, 101, ..., 100x) supportés par une bande transporteuse (4) s'étendant sur une longueur prédéterminée (L) suivant un premier plan d'agencement horizontal (X), ladite bande transporteuse (4) étant mobile à une première vitesse d'avancement constante (v1) ;
- le prélèvement d'un sachet en forme de coussin à la fois en déterminant la position spatiale (S2) de celui-ci comme une fonction de l'instant de passage (S1), de ladite première vitesse d'avancement constante (v1) et de ladite longueur prédéterminée (L) de ladite bande transporteuse (4) ;
- le dépôt dudit sachet en forme de coussin prélevé dans un espace de logement (8) défini sur un plan de support (5) qui est mobile à une deuxième vitesse d'avancement (v2) ;
- le changement de ladite deuxième vitesse d'avancement (v2) dudit plan de support (5) comme une fonction de ladite position spatiale pour le prélèvement dudit sachet en forme de coussin par rapport à un axe de référence (Pr).

13. Procédé selon la revendication 12, dans lequel ladite étape de changement de ladite deuxième vitesse d'avancement (v2) dudit plan de support (5) fournit l'augmentation de ladite deuxième vitesse d'avancement (v2) quand ladite position spatiale pour le prélèvement dudit sachet en forme de coussin est en aval dudit axe de référence (Pr).

14. Procédé selon la revendication 12, dans lequel ladite étape de changement de ladite deuxième vitesse d'avancement (v2) dudit plan de support (5) fournit la diminution de ladite deuxième vitesse d'avancement (v2) quand ladite position spatiale pour le prélèvement dudit sachet en forme de coussin est en amont de l'axe de référence (Pr).

15. Procédé selon la revendication 12, comprenant les étapes suivantes :

- l'acquisition d'une valeur représentative de la pluralité de sachets prédéterminée de sachets en forme de coussin logeables dans ledit espace de logement (8) ;
- le suivi du nombre de sachets en forme de coussin placés dans un espace de logement individuel (8) ;
- la répétition des étapes de prélèvement dudit sachet en forme de coussin à la fois en déterminant la position spatiale (S2) de celui-ci jusqu'à ce que ledit nombre de sachets en forme de coussin transportés dans un espace de logement individuel (8) soit inférieur ou égal à ladite valeur représentative de la quantité maximale de sachets en forme de coussin logeable dans ledit espace de logement (8).

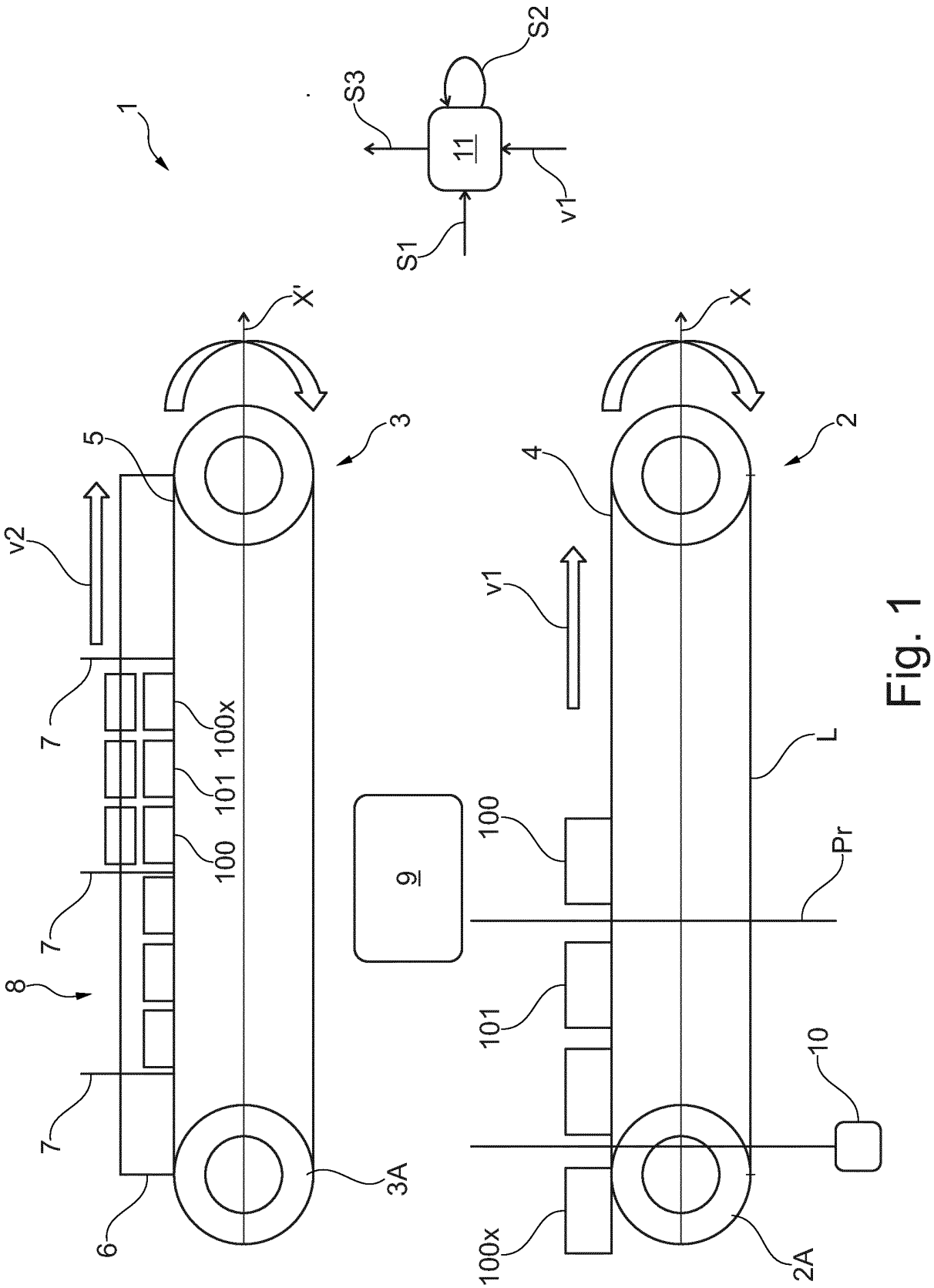
1
S2
S3
11
S1
v1
X'
3
5
v2
7
100x
101
100
7
8
7
6
3A
9
X
2
4
v1
L
100
Pr
101
10
100x
2A

Fig. 1

REFERENCES CITED IN THE DESCRIPTION

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