



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
06.11.2024 Bulletin 2024/45

(51) International Patent Classification (IPC):
B65B 43/16 (2006.01)

(21) Application number: **24173967.1**

(52) Cooperative Patent Classification (CPC):
B65B 43/16; B65B 43/465

(22) Date of filing: **02.05.2024**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL
NO PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA
Designated Validation States:
GE KH MA MD TN

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(30) Priority: **03.05.2023 IT 202300008757**

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(54) **A PACKAGING MACHINE AND A METHOD FOR HANDLING A CONTAINER IN A PACKAGING MACHINE**

(57) A packaging machine (100) having a conveyor means to convey flexible containers along a working path; and a series of working stations arranged along the said working path wherein one these working station is a positioning station (103) equipped with a first and a second grasping means (3, 4) able to collectively hold a container in a suspended fashion and in a vertical plane, detection means (31, 41) configured to detect the vertical level and tilt of an edge (1a) of the held container that extends between the first and the second grasping means when the said grasping means hold the container; and driving means able to move the first and the second grasping means (3, 4), specifically to change at least their vertical distance while they collectively hold the container to arrange the said container's edge (1a) at a target vertical level and tilt.

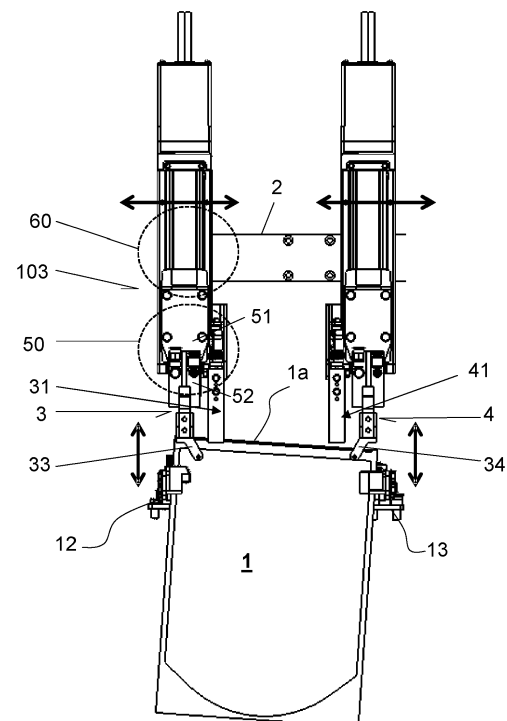


Fig. 1

Description

Technical field of the invention

[0001] The invention belongs to the field of packaging machines, particularly automatic horizontal packaging machines.

Background of the invention

[0002] Packaging machines are conventionally equipped with a container conveying means to transport containers along successive working stations wherein the containers are opened, filled and sealed. Other operations can be performed on the conveyed containers depending on the type of container and the nature of the product or products to be stored therein.

[0003] One type of packaging machine is that which procures packaging in flexible containers, as bags or pouches, that are transported suspended following a horizontal path along which the various working stations for executing operations on the containers are arranged, including that procuring the opening, filling and sealing of the containers.

[0004] It is known to supply already made but empty containers to a packaging machine, the containers being intended to be opened, filled and sealed in the packaging machine. In the relevant art they are referred to as pre-made containers.

[0005] The pre-made containers are sequentially supplied to the packaging machine from a magazine. There are magazines prepared to be loaded with a batch of containers, arranged in a stack fashion. The magazines may have means to tightly accommodate stacks of pouches of different formats, for example, by providing magazines with parts, such as walls, moveable to determine storage spaces according to the specific dimensions of the stacked pouches. The format of the containers can also vary depending on other non-dimensional aspects, such as the provision of a spout which is used by a consumer for extracting the product with which the containers will be filled in the packaging machines, for consumption. In addition, these spouts can be located centrally or in a corner of the containers. All this requires not only preparing the magazine to store and serve containers of different formats, but also transferring containers of different formats to the packaging machine in a correct position so that they can be properly conveyed along the working stations. If the containers are not transferred in a predetermined specific orientation, that can vary depending on the format of the containers, their conveying through the working stations will be defective and the operations that have to be carried out over the containers will also be defective. Indeed, it is known to equip packaging machines with means that, in case of detection that a container is being conveyed but not in a predetermined specific orientation, the container is rejected, for example, before filling it.

[0006] The patent document EP 2712727 describes a container magazine equipped with means to separate and feed a first pouch of a stack of pouches to a pick up area from where movable transfer means picks-up the separated pouch, transports and delivers it to a conveying means of a packaging machine.

[0007] The moveable transfer means have a first feeding device that, in a reciprocating motion, are able not only to pick-up the separated pouch waiting in the pick up area upwardly unloading it to a substantially vertical orientation, but also to change its orientation in the vertical plane a predetermined angular range. Specifically, the first feeding device comprises a driven pivot shaft for that purpose, perpendicularly oriented with regards to the picked-up pouch. The first feeding device delivers the vertically arranged pouch to a second feeding device which carries out a further feeding step that consists of translating the pouch to a static transfer position to be grasped by a pair of grippers of the conveying means of the packaging machine stopped at the pouch transfer position.

[0008] The patent document EP 2100813 describes a pouch transport and tilt-correction device provided between a rotary-type pouch manufacturing device and a rotary-type pouch packaging machine in a system for manufacturing, filling and sealing pouches with corner spouts.

[0009] The aim of the pouch transport and tilt-correction device is to transfer in a predetermined specific orientation, in a vertical plane, previously manufactured empty pouches to the conveying means of the packaging machine.

[0010] It is a first objective of the present invention to provide an alternative solution to the known ways of ensuring that a container, particularly in the form of a pouch, is being conveyed in the packaging machine in a predetermined specific orientation within a vertical plane.

[0011] Further objectives of the invention are providing a packaging machine that simplifies the packaging installations; a more versatile packaging machine; and the reduction of pouches rejected for being defective, to name some.

Description of the invention

[0012] With the aim of finding a solution to the achievement of at least the above indicated objectives, a packaging machine according to claim 1 is disclosed.

[0013] The packaging machine has a conveyor means to convey flexible containers along a working path; and a series of working stations arranged along the said working path to perform operations on the conveyed containers.

[0014] At least one of these working station is a positioning station equipped with a first and a second grasping means, each grasping means configured to grasp a flexible container at a respective point or area, collectively holding the container in a suspended fashion and in a

vertical plane; equipped with detection means configured to detect the vertical level and the tilt of an edge of the held container that extends between the first and the second grasping means when the said grasping means hold the container; and equipped with driving means able to independently move the first and the second grasping means, specifically to change at least their vertical distance while they collectively hold the container to arrange the said container edge at a target vertical level and tilt detected by the detection means.

[0015] The terms "a" and "one" are used herein to refer to one or more than one (i.e., to at least one) of the grammatical object of the term. By way of example, "an element" means one or more elements.

[0016] Throughout the specification, the phrase "which comprises", or variations such as "comprises" or "comprising" a certain element or action, will be understood to imply the inclusion of these, but not the exclusion of any other element or action.

[0017] Similarly, "equipped with" a certain element, will be understood to imply the inclusion of this, but not the exclusion of any other element.

[0018] A target tilt can be a non-tilt.

[0019] As will be better understood from the description of an exemplary embodiment, the provision of a positioning station to the packaging machine makes the latter more versatile. The same positioning station can be used for different purposes and can replace, and avoid duplication, of container position correcting means previously required when a packaging machine was supplied with containers (in the form, for example, of pouches) from different sources, for example from a pre-made container magazine and from a container-from-a-film forming module.

[0020] Further, the same positioning station, in addition to perform the function that separately performed positioning means associated to the pre-made container magazine and the container-from-a-film forming module, can also perform positioning operations that do not obey to have to correct imprecise positioning of a container, but to make the packaging machine more versatile making it able to work with containers of more different formats, including containers without spout and containers with spout, for instance a central spout or, more interestingly, a corner spout.

[0021] In an embodiment, the positioning station comprises a first and a second detection means arranged between the first and the second grasping means.

[0022] In an embodiment, the first and the second detection means are respectively arranged adjacent to the first and the second grasping means, in a way that they can be prevented from moving during a vertical movement of the grasping means.

[0023] Knowing the location of the detection means, this measurement allows the obtention of information about the absolute position of the container, or about its relative position with respect to the positioning station.

[0024] The particular location of the first and the sec-

ond detection means allows, with only two detector means, to achieve the desired effects, measuring or knowing the location of only two points of the edge of the container.

[0025] In one embodiment, the driving means comprise governable mechanisms to independently and linearly move each grasping means in the vertical direction.

[0026] A governable mechanism can comprise a fixed part, solidly attachable to a support body of the positioning station or to a moveable carrier, and a mobile part with respect to the said fixed part, that carries a grasping means, wherein an associated detection means is solidly attached to the fixed part of the governable mechanism.

[0027] A detection means may comprise a proximity sensor or an array of proximity sensors, able to detect the presence of a nearby container edge without any physical contact.

[0028] A detection means can be, for example, a fork optical sensor.

[0029] In an embodiment, at least one of the governable mechanisms is attachable to the associated support body, or moveable carrier, of the positioning station to adopt different positions along a horizontal reference.

[0030] Preferably, the two governable mechanisms are attachable to the associated support body, or moveable carrier, of the positioning station to adopt different positions along a horizontal reference.

[0031] Preferably, the fixed part of one or both of the governable mechanisms are attachable to the associated support body, or moveable carrier, of the positioning station to adopt different positions along a horizontal reference.

[0032] In an embodiment, the driving means comprise a secondary governable mechanism acting over at least one governable mechanism to independently and linearly move the associated grasping means in the horizontal direction.

[0033] Preferably, to secondary mechanisms act each over a governable mechanism to independently and linearly move the associated grasping means in the horizontal direction.

[0034] Preferably, the secondary mechanism or mechanisms act each over a fixed part of a governable mechanism.

[0035] The invention envisages other mechanical alternatives to provide at least one, and preferable the first and the second, grasping means with two degrees of freedom, within a vertical plane.

[0036] A secondary governable mechanism may comprise a fixed part, solidly joined or forming part of the support body, and a mobile part with respect to the support body carrying a or linked to a grasping means.

[0037] In an embodiment, the mobile part of a secondary governable mechanism carries a fixed part of the governable mechanism, the mobile part of the secondary governable mechanism acting as a moveable carrier.

[0038] In an embodiment, the packaging machine has two container reception stations and there is no position-

ing station arranged along the working path in between the said two reception stations.

[0039] Naturally, a packaging machine can have a plural number of positioning stations.

[0040] It is also claimed a method of handling a container, for instance in the form of a container, in a packaging machine according to the claim 1, wherein the working path is defined by a closed track to which moveable carriages are coupled and can be independently operated for their movement along the track, the carriages having each a conveying clamp the conveying clamps of two consecutive carriages cooperating to hold and convey a container along the working path in a suspended fashion.

[0041] The method comprises temporarily transferring a conveyed container to the first and the second grasping means of a positioning station, moving at least one of the first and the second grasping means while holding the transferred container tilting the temporarily transferred container to a target vertical level and tilt and transferring the temporarily transferred container to the conveying clamps of the moveable carriages.

[0042] In an embodiment, the method further comprises moving, before and/or during the tilting of the temporarily transferred container, at least one of the conveying clamps of the moveable carriages to better receive the said carriages in the target vertical level and tilt position.

[0043] In an embodiment, at least one of the conveying clamps are at a different absolute position when the conveyed container is temporarily transferred to the grasping means of the positioning station and when the temporarily transferred container is transferred again to the conveying clamps after being tilted.

[0044] The advantages of this way of proceeding are explained later.

[0045] In an embodiment, the container is a container having, or destined to have, a corner spout and the container edge is that where the spout is arranged or is to be arranged.

[0046] In variant of interest wherein the container is a container having, or destined to have, a corner spout and the container edge is that where the spout is arranged, or is to be arranged, the target tilt is a non-tilt.

Brief description of the drawings

[0047]

Fig. 1 shows an embodiment of a positioning station of a packaging machine according to the invention;

Figs. 2a and 2b, are a sequence that illustrates the capability of the positioning station of the Fig. 1 to tilt a container in the form of a pouch held suspended in a vertical plane to arrange it in a target orientation, optimal so that a downstream working station of the packaging machine can operate on the pouch;

Figs. 3a and 3b, are a sequence that illustrates the capability of the positioning station of the Fig. 1 to correct the vertical position of a pouch held suspended in a vertical plane;

Figs. 4a and 4b, are a sequence that illustrates the capability of the positioning station of the Fig. 1 to correct the tilt of a pouch in a vertical plane;

Figure 5 exemplifies a packaging machine according to the invention.

Detailed description of the invention

[0048] The invention is exemplified in the packaging machine 100 of Fig. 5.

[0049] The packaging machine 100 of the example is a horizontal type packaging machine. The machine 100 comprises a conveyor means 10 to convey flexible containers along a working path.

[0050] In the example, the containers 1 are pouches. We refer to pouches as flexible containers mainly made from film material that, when empty, can adopt a flat configuration. There are, without being limited to, flat pouches, box bottom pouches and doypack pouches, to name some.

[0051] In the example, the working path is defined by an oval track 11 to which moveable carriages are coupled and can be operated for its movement along the track 11. In the example, the carriages have each a conveying clamp and the conveying clamps of two consecutive carriages cooperate to hold and convey a pouch along the working path in a suspended fashion, the pouches being essentially vertical.

[0052] In the machine 100, there is a series of working stations arranged along the working path that the conveyed pouches follow.

[0053] When a conveyed pouch, or group of pouches, is stopped in a specific working station, certain operations can be carried out on the pouch or pouches.

[0054] Other operations can be carried out on the pouches while they are conveyed between working stations. For example, the containers can be opened or closed by approaching or distancing, respectively, the carriages whose clamps cooperate to hold the pouch, at the same time the carriages move forward conveying the pouch.

[0055] Indeed, the opening and closing a pouch by changing the distance between clamps grasping a pouch is a common practice when the clamps grasp the pouch at opposite vertical edges thereof, practice that is performed sometimes with the pouch at a working station and sometimes while conveying the pouch.

[0056] The machine 100 of Fig. 5 is prepared to be supplied with pre-made pouches. The pre-made pouches are transferred from a pouch magazine 101 to the machine 100 and to that effect the machine 100 have a reception station 102. In the reception station 102 the

clamps of two consecutive carriage elements will grasp a pouch at opposite vertical edges thereof.

[0057] Downstream the reception station 102 the machine 100 has a positioning station 103.

[0058] One aim of this positioning station 103 can be to correct deviations occurred when handling the pouch upstream of the process, for example during its transfer to the packaging machine 100 from the pouch magazine 101.

[0059] To correct a deviation can be of interest, for example, before conveying a pouch to the filling or to the sealing station, where the filling and/or the sealing operations are performed by tools that must interact with the pouch very accurately. If the relative position between the said tools and the pouch is not proper, for example because the pouch is slightly tilted with respect to a pre-determined orientation, the operations carried out on the pouch can be defective.

[0060] The positioning station 103 can deploy, however, other roles.

[0061] In this sense, another aim of the positioning station 103, added to or alternatively to the previous one, can be disposing the pouch matching with the predetermined position that is proper, more adequate or preferable to operate on the pouch in one or more downstream working stations.

[0062] The determined position can be a non-tilted position with regards to the position adopted by the container when transferred to the positioning station but a vertically displaced position.

[0063] A determined position can be a tilted position with regards to the position adopted by the container when transferred to the positioning station, vertically displaced, or not, with regards to the position adopted by the container when transferred to the positioning station.

[0064] It is also worth noticing that it is envisaged the provision of more than one positioning stations 103 to a packaging machine 100. In case two working stations require the pouch to be positioned different with respect to the conveyed position at the arrival to the working station, a positioning station 103 can be provided before the working station in need thereof in the forward direction of the conveying.

[0065] Fig. 1 shows a positioning station 103 according to an embodiment of the invention.

[0066] The positioning station 103 of the Fig. 1 comprises of a support body 2, made of one or multiple parts, adapted to be firmly attached to the chassis of the machine (not showed in Fig. 1) and to remain static during the normal operation of the machine.

[0067] A first and a second grasping means 3, 4 are linked to the support body 2.

[0068] In the example of Fig. 1, each grasping means 3, 4 are configured to grasp a container 1, that is, a pouch, from different points, collectively holding the pouch in a suspended fashion and in a vertical plane.

[0069] To that effect, in the example of Fig. 1, the first and the second grasping means 3, 4 have a respective

positioning clamp 33, 43.

[0070] The first and the second grasping means 3, 4 are linked to the support body 2 with the capacity to be moved with respect to the said support body 2.

5 **[0071]** In the specific example of Fig. 1 a movement of the first and the second grasping means 3, 4 is guided to follow a straight vertical path, when the support body 2 is correctly attached to the machine 100.

10 **[0072]** Each grasping means 3, 4 can be driven independently each other, so that it is possible to change their vertical distance while they collectively hold the container 1 if they are driven to move a different distance and/or a different direction. This vertical movement is indicated in the Fig. 1 using vertical arrows.

15 **[0073]** By way of example only, linear motors, piston drives, spindle actuators or rack and pinion couplings are governable mechanisms that can be used to linearly displace a grasping means with respect to the support body.

20 **[0074]** In the example of Fig. 1, a governable mechanism 50 comprises a fixed part 51, solidly attachable to the support body but preferably, which is the case of the example, to a moveable carrier, and a mobile part 52 that will carry a grasping means 3 or 4.

25 **[0075]** In order the positioning station 103 to be adaptable to the different pouch formats and needs, the first and the second grasping means 3, 4 can be linked to the support body 2 with the capacity to be horizontally moved with respect to the support body, to get closer or further away apart from vertically, also horizontally. In this case
30 the fixed part 51 of the governable mechanism above mentioned can be adapted to be linked to the support body 2 with the capacity to be moved with respect to the said support body 2.

35 **[0076]** While the governable mechanism 50 providing for the vertical movement of a grasping means 3, 4 is intended to be easily driven to produce their vertical movement each time a new pouch is held, if required, the solution for providing the first and the second grasping means 3, 4 with ability to be horizontally moved to get
40 closer or away may not require maneuvering each time a pouch is held.

[0077] Then, in an embodiment of the invention, it is enough to provide measures to removably attach at least one of the fixed parts 51 of the governable mechanisms 50 that produces the vertical displacement of each first and second grasping means 3 and 4 in different positions, along a horizontal reference, with respect to the support body 2. To that effect, the support body 2 can be provided with a horizontal rail or the like.

50 **[0078]** Alternatively, the positioning station 103 can be provided with a secondary governable mechanism 60, or mechanisms, to produce this horizontal movement of the grasping means 3 and/or 4, approaching or moving away each other.

55 **[0079]** A secondary governable mechanism can be provided to horizontally move only one of the first and the second grasping means, for example to horizontally move the fixed part of its governable mechanism, or to

simultaneously move both the first and the second grasping means, for example to move the fixed parts of their respective governable mechanisms towards or away each other.

[0080] Alternatively, which is the case of the example of Fig. 1, two secondary governable mechanisms 60 can be provided each to horizontally move a corresponding grasping means 3, 4, namely to horizontally move the fixed parts 51 of their governable mechanisms 50: each secondary governable mechanism 60 will then comprise a fixed part, solidly joined or forming part of the support body 2, and a mobile part with respect to the support body 2 that will carry the fixed part 51 of their governable mechanisms 50.

[0081] In the latter case, this will provide both grasping means with two degrees of freedom, to move within the vertical plane.

[0082] By way of example only, linear motors, piston drives, spindle actuators or rack and pinion couplings are possible secondary governable mechanisms that can be used to linearly displace a grasping means, or in its defect the fixed part of its governable mechanism, with respect to the support body.

[0083] In any case, this horizontal movement is indicated in the Fig. 1 using horizontal arrows.

[0084] Turning back to the main features of the positioning station 103 of the Fig. 1, it has a detection means, particularly two detection means 31, 41 arranged between the first and the second grasping means 3, 4 and configured to detect the vertical position of an edge of the held pouch (container 1) that extends between the first and the second grasping means 3, 4 when the said grasping means hold the container 1.

[0085] In the example of the Fig. 1, a first and a second detection means 31, 41 are respectively arranged adjacent the first and the second grasping means but, contrary to said grasping means the detection means 31, 41 are linked to the support base 2 without the ability to be vertically moveable.

[0086] In the exemplary embodiment of Fig. 1, the detection means 31, 41 are solidly attached to the fixed parts of the governable mechanisms of the respective grasping means 3, 4.

[0087] A detection means can be of the type comprising a proximity sensor or an array of proximity sensors able to detect the presence of a nearby pouch without any physical contact.

[0088] In an embodiment, a detection means is a fork optical sensor.

[0089] The Figs. 2a, 2b; 3a, 3b; and 4a, 4b serve to illustrate the capabilities of a positioning station 103 according to the invention.

[0090] Figs. 2a and 2b are a sequence that shows the tilting of a pouch, with a contour particularly intended to receive a corner spout, from a conveying position to a target position. In the example, the target position is a position wherein the container edge where the spout is to be arranged is non-tilted.

[0091] Particularly, Fig. 2a shows the initial position of the pouch (container 1), at a moment when the conveyed pouch stops in the positioning station 103, the first and the second grasping means 3, 4 grasp the pouch and the conveying clamps 12, 13 of the packaging conveying means releases the pouch, completing a temporary pouch transfer to the positioning station 103.

[0092] Fig. 2b shows the final position of the pouch, produced as a result of changing the relative position of the grasping means 3, 4, comprising changing its vertical distance, and optionally, indeed practiced in the example of the sequence of Figs. 2a and 2b, also changing its horizontal distance. The pouch is then ready to be grasped again by the conveying clamps 12, 13 and released by the grasping means 3, 4, finishing the temporary pouch transfer to the positioning station 103.

[0093] A position such as the one illustrated in Fig. 2b can mean that a working station arranged downstream the working path is capable of placing spouts in pouches, both in formats in which the spout is located centrally and in formats in which the pouch is a corner spout and is inclined with respect to the vertical of the pouch.

[0094] Also, for the latter case, the position illustrated in Fig. 2b allows a better use of the storage volume of the pouch, since it allows to make up or almost make up the free surface of a liquid product introduced in the pouch with the outlet mouth of the pouch.

[0095] The change of the relative position of the grasping means 3, 4 with respect to each other can be produced by actuating the governable mechanism and, if that was the case, also the secondary governable mechanism or mechanisms, in a way dictated by the signals generated by the first and second detection means 31, 41, that are used as informers to know when the position of the pouch (container 1) matches the target position.

[0096] The operative of the working station 103 can be implemented by a control unit using a software.

[0097] The control unit can store, or have access to, a library storing as digital data the positions at which the upper edge 1a of the pouch (container 1), specifically the two points of the same to be detected by the detection means 31, 41, are assigned with a specific pouch format. The software can command the governable mechanism 50, and optionally also the secondary governable mechanism 60, to move the grasping means 3, 4 within the vertical plane so that the spatial position of the two points of the upper edge 1a of the pouch, detected by the detection means 31, 41, matches with that assigned for the specific pouch format currently handled in the positioning station 103.

[0098] Taking advantage of that the conveyor clamps 12, 13 can be independently driven, they can be moved before and/or during the tilting of the pouch, while they adopt their release state, to not interfere with the pouch if the tilting is notable, to then be moved again up to the proper position to grasp again the pouch, once the pouch is in its target position, to convey the pouch downstream.

[0099] If the tilting is noticeable, the vertical movement

of the grasping means may need to be combined with a horizontal movement of the same to avoid undesirably stressing or relaxing the pouch.

[0100] Figs. 3a and 3b are a sequence that shows a vertical translation of a pouch, without tilting it.

[0101] Figs. 4a and 4b are a sequence that shows a tilting of a pouch, to exemplify a case in which a pouch having a rectangular contour is being conveyed slightly inclined when the desirable position is that in which the upper edge of the pouch should be horizontal.

[0102] The provision of a positioning station 103 to the packaging machine 100 makes the latter more versatile. The same positioning station 103 can be used for different purposes and can replace, and avoid duplication, of pouch position correcting means previously required when a packaging machine was supplied with pouches from different sources, for example from a pre-made pouch magazine and from a pouch-from-a-film forming module.

[0103] A positioning station 103 arranged along the working path of a packaging machine, in addition to perform the function that separately performed positioning means associated to the pre-made pouch magazine and the pouch-from-a-film forming module, can also perform positioning operations that do not obey having to correct imprecise positioning of a pouch, but to make the packaging machine more versatile making it able to work with pouches of more different formats, including pouches without spout and pouches with spout, a central spout or, more interestingly, a corner spout.

Claims

1. A packaging machine (100) having a conveyor means to convey flexible containers along a working path; and a series of working stations arranged along the said working path to perform operations on the conveyed containers, **characterized in that** at least one of these working station is a positioning station (103) equipped with

- a first and a second grasping means (3, 4), each grasping means configured to grasp a flexible container (1) at a respective point or area, collectively holding the container in a suspended fashion and in a vertical plane,
- detection means (31, 41) configured to detect the vertical level and the tilt of an edge (1 a) of the held container (1) that extends between the first and the second grasping means when the said grasping means hold the container; and
- driving means able to independently move the first and the second grasping means (3, 4), specifically to change at least their vertical distance while they collectively hold the container to arrange the said container edge (1a) at a target vertical level and tilt detected by the detection

means (31, 41).

2. A packaging machine (100) according to the claim 1, **characterized in that** it comprises a first and a second detection means (31, 41) respectively arranged adjacent to the first and the second grasping means (3, 4), in a way that they can be prevented from moving during a vertical movement of the grasping means (3, 4).
3. A packaging machine (100) according to any one of the preceding claims, **characterized in that** the driving means comprise governable mechanisms (50) to independently and linearly move each grasping means (3, 4) in the vertical direction.
4. A packaging machine (100) according to the claim 3, **characterized in that** a governable mechanism (50) comprises a fixed part (51), solidly attachable to a support body (2) of the positioning station (103) or to a moveable carrier, and a mobile part (52) with respect to the fixed part (51), that carries a grasping means (3 or 4), wherein a detection means (31 or 41) is solidly attached to the fixed part (51) of the governable mechanism (50).
5. A packaging machine (100) according to any one of the proceeding claims, **characterized in that** a detection means (31 or 41) comprises a proximity sensor or an array of proximity sensors able to detect the presence of a nearby container edge (1a) without any physical contact.
6. A packaging machine (100) according to the claim 5, **characterized in that** a detection means (31, 41) is a fork optical sensor.
7. A packaging machine (100) according any one of the preceding claims, **characterized in that** the driving means comprise secondary governable mechanisms (60) to independently and linearly move at least one of the grasping means (3, 4) in the horizontal direction.
8. A packaging machine (100) according to the claims 4 and 7, **characterized in that** a secondary governable mechanism (60) comprises a fixed part, solidly attachable to a support body (2) of the positioning station (103), and a mobile part with respect to the fixed part, wherein the mobile part of the secondary governable mechanism (60) carries the fixed part of a governable mechanism, the mobile part of the secondary governable mechanism acting as a moveable carrier.
9. A packaging machine (100) according to any one of the preceding claims, **characterized in that** it has two container reception stations (102), and **in that**

there is no positioning station (103) arranged along the working path in between the said two reception stations (102).

10. A packaging machine (100) according to any one of the preceding claims, **characterized in that** it has a plural number of positioning stations (103). 5

11. A packaging machine (100) according to the claim 1, **characterized in that** the first and the second grasping means (3, 4) have two degrees of freedom, to move within a vertical plane. 10

12. A method of handling a container in a packaging machine (100) according to the claim 1, wherein the working path is defined by a closed track (11) to which moveable carriages are coupled and can be independently operated for their movement along the track, the carriages having each a conveying clamp (12, 13) the conveying clamps of two consecutive carriages cooperating to hold and convey a container (1) along the working path in a suspended fashion, the method comprising temporarily transferring a container to the first and the second grasping means (3, 4) of a positioning station (103), moving at least one of the first and the second grasping means (3, 4) while holding the transferred container vertically displacing and/or tilting the temporarily transferred container and transferring the temporarily transferred container to the conveying clamps (12, 13). 15
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13. A method according to the claim 12, **characterized in that** it further comprises moving, before and/or during the tilting of the temporarily transferred container (1), at least one of the conveying clamps (12, 13). 35

14. A method according to the claims 12 or 13, **characterized in that** at least one of the conveying clamps (12, 13) are at a different absolute position when the conveyed container (1) is temporarily transferred to the grasping means (3, 4) and when the temporarily transferred container is transferred again to the conveying clamps (12, 13) after being tilted. 40
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15. A method according to any one of claims 12 to 14, **characterized in that** the container (1) is a container having, or destined to have, a corner spout and the container edge (1a) is that where the spout is arranged or is to be arranged, and wherein the target tilt is a non-tilt. 50

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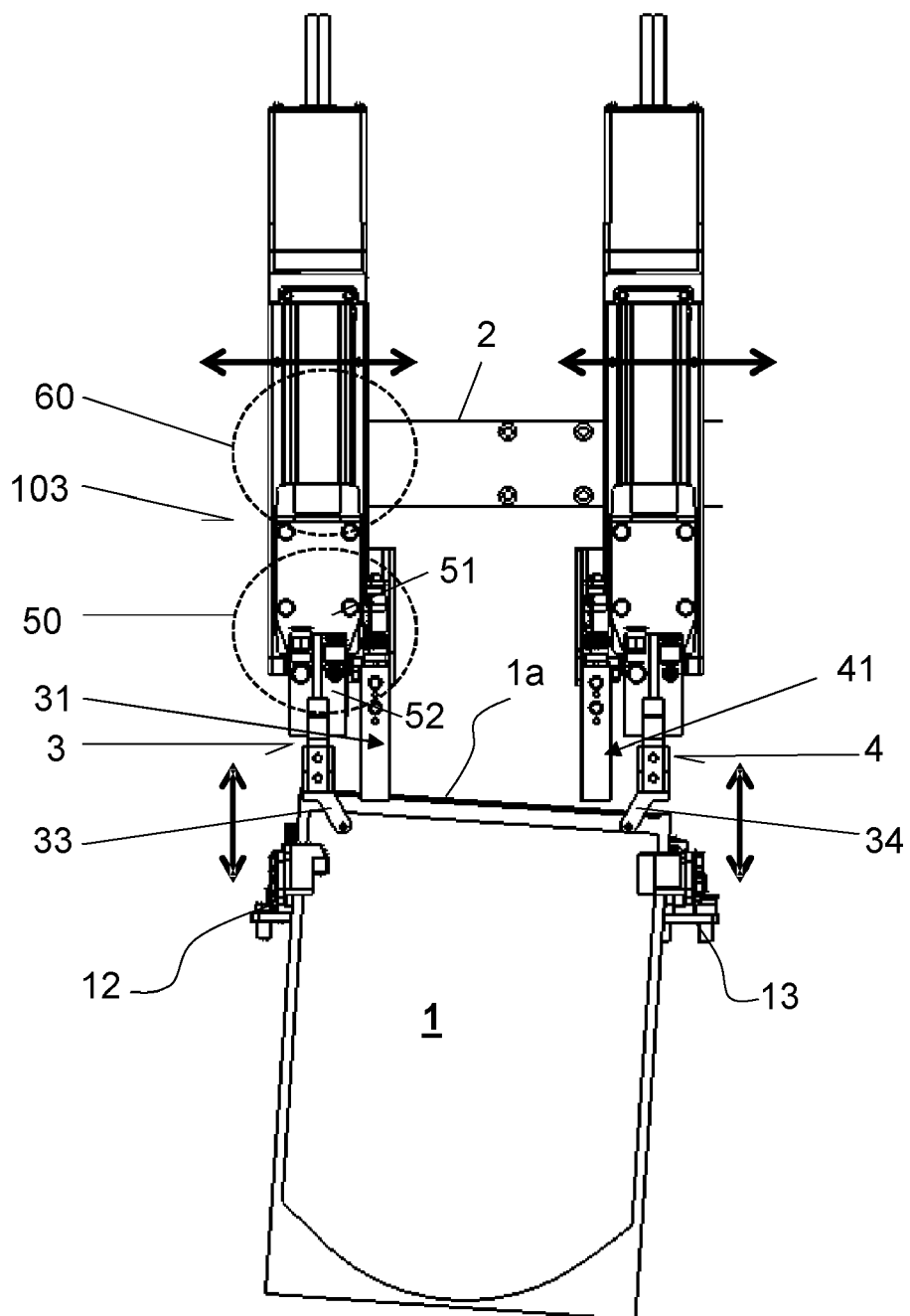


Fig. 1

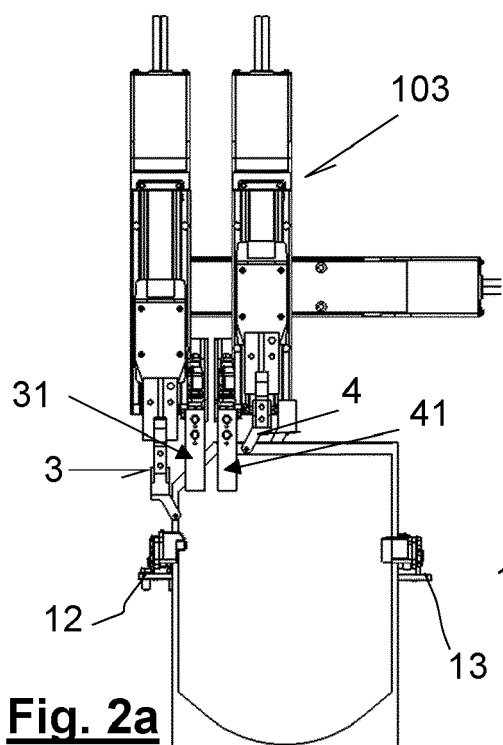


Fig. 2a

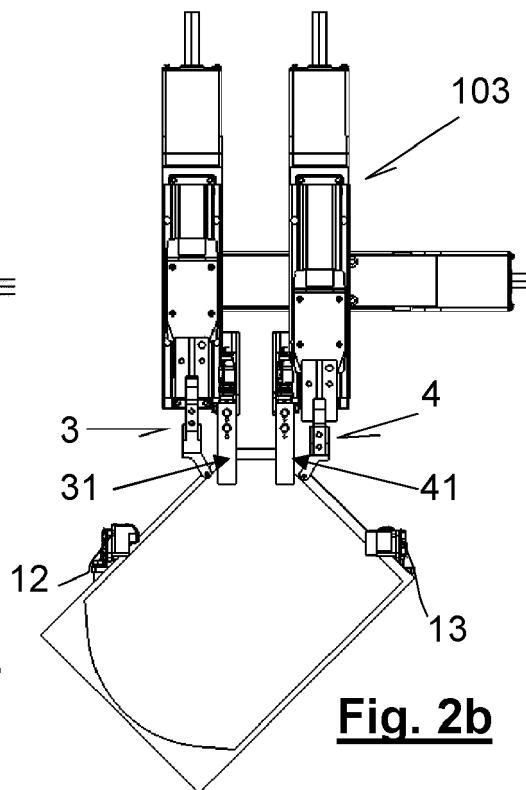


Fig. 2b

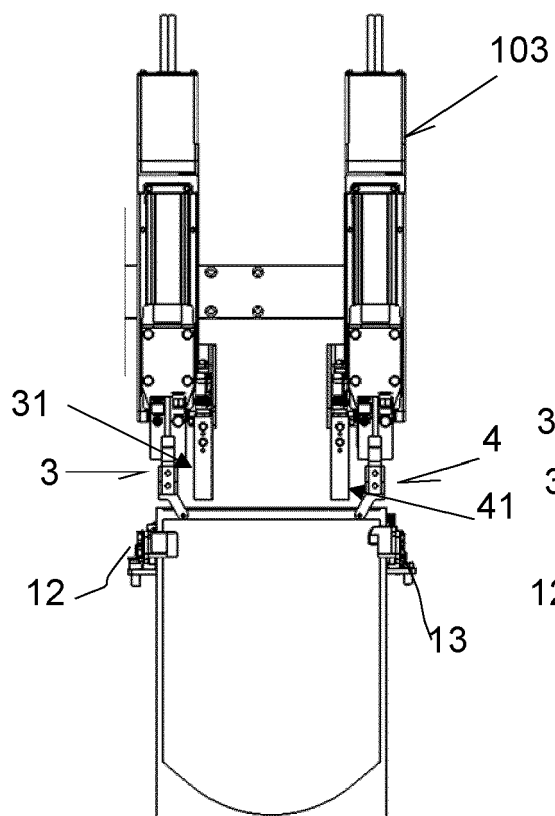


Fig. 3a

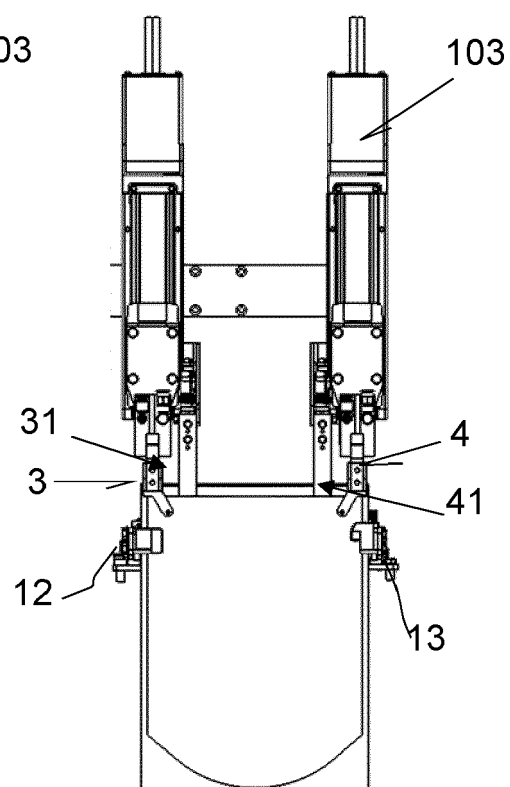


Fig. 3b

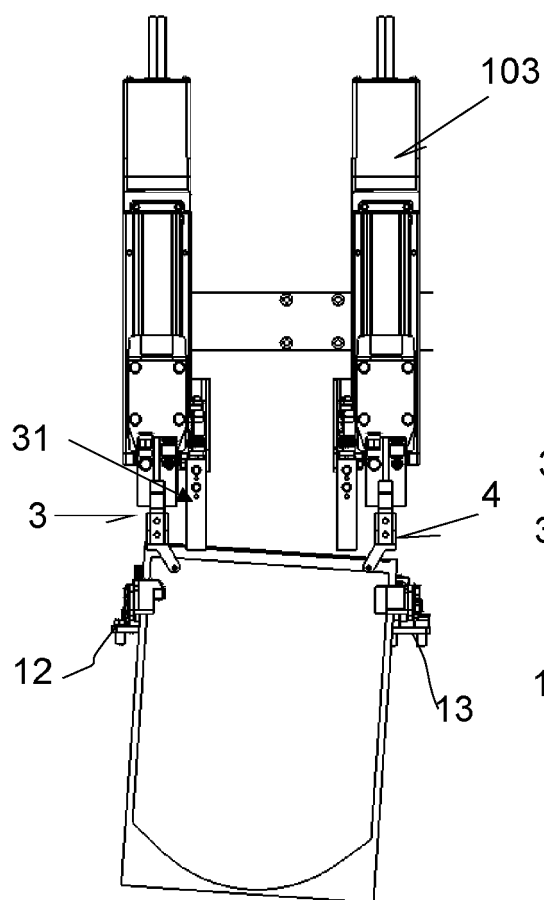


Fig. 4a

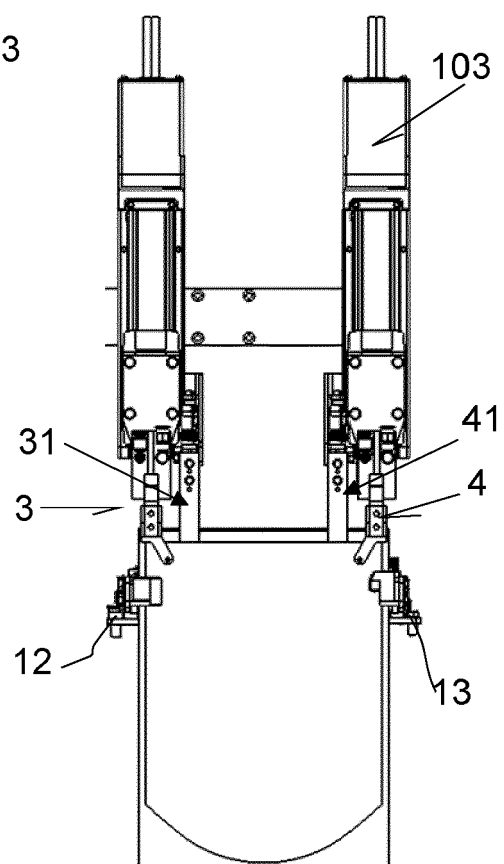


Fig. 4b

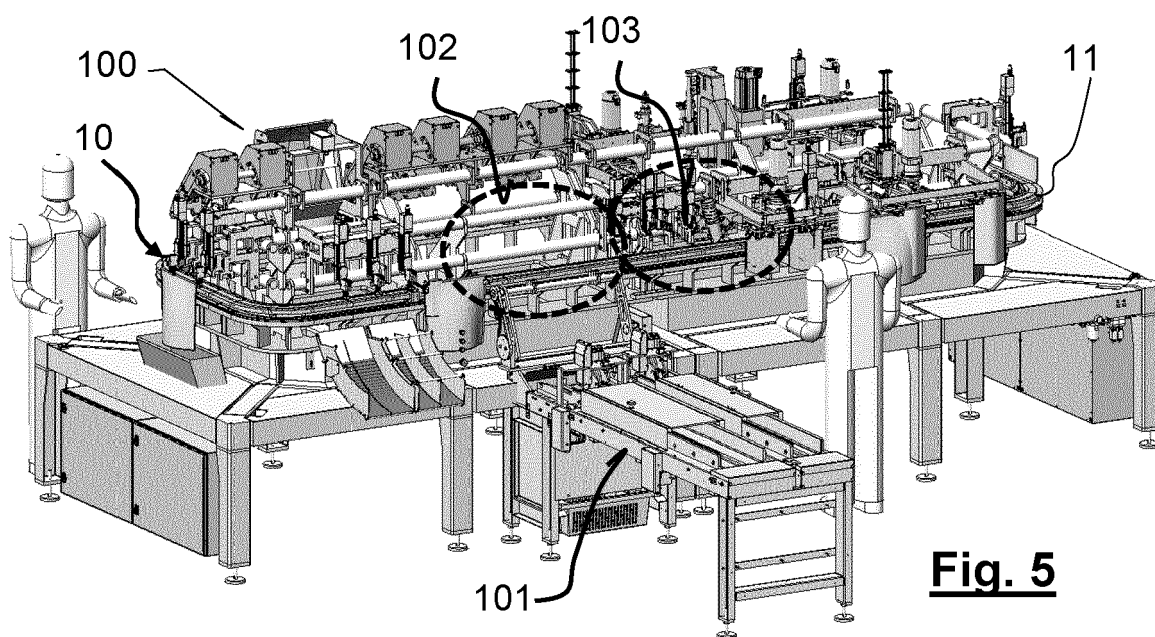


Fig. 5



EUROPEAN SEARCH REPORT

Application Number

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A	WO 2020/239272 A1 (MESPACK SL [ES]) 3 December 2020 (2020-12-03) * page 1, line 9 - line 15; figure 1 *	1,12	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D B65B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 23 September 2024	Examiner Bridault, Alain
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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