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(54) DEVICE AND METHOD FOR PLACING BAGS IN A FILLING MOUTH

(57) The device comprises a filling mouth (1) that feeds the product inside the bag; hands (2) that hold and move an empty bag, the hands (2) being movable between the following positions: a collecting position (P0) in which the bag is collected; a waiting position (P1) in which the bag is placed closer to the filling mouth (1) than in the collecting position; a filling position (P2) in which the bag is taken by filling mouth clamps (10); and a bag releasing position (P3) in which the system releases the bag once it has been taken by the filling mouth clamps (10). The method comprises placing a bag in the cited positions.

It permits to provide a device in which the time lost for the placement of a bag is reduced, in comparison to the conventional devices for placing bags in a filling mouth.

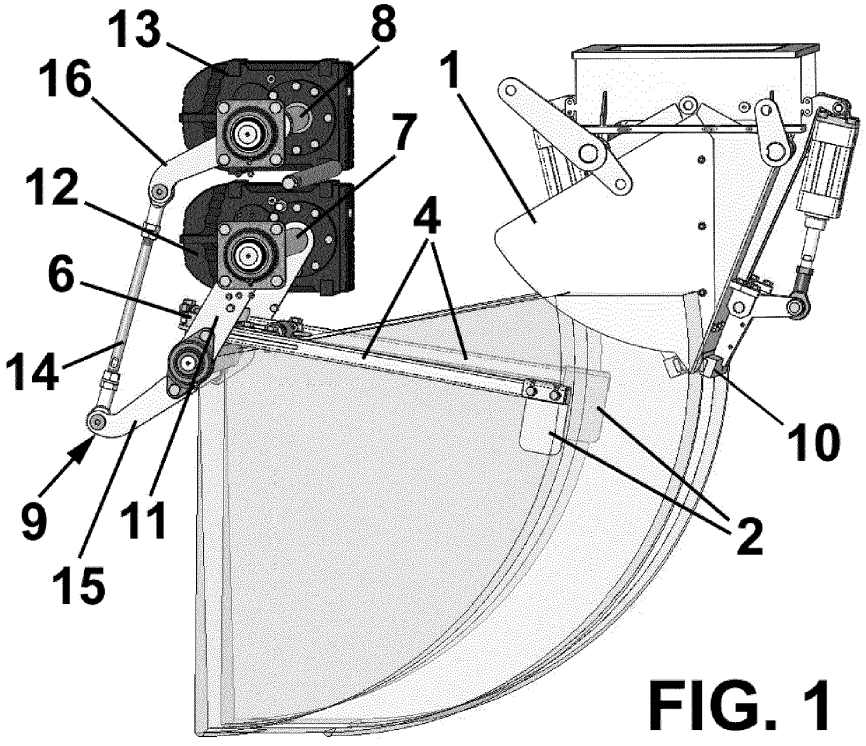

FIG. 1

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Description

Field of the invention

[0001] The present invention refers to a device and a method for placing bags in a filling mouth, in which the lost time for placing a bag in its filling position is reduced.

Background of the invention

[0002] Some products, such as bulk products, are provided in bags of different dimensions. The filling of these kind of bags is made automatically with a device specially designed to this end.

[0003] These devices usually comprise the following elements:

- a filling mouth that feeds the product to be placed inside the bag that is movable between an open position and in a closed position;
- hands that hold the empty bag open and take it to the filling mouth; and
- optional grippers that hold the bag gussets and move along with the hands.

[0004] In these devices, the productivity is an essential feature, i.e., the time lapsed for filling a bag, including the time for placing and removing the bag from its filling position.

[0005] In these known devices the filling bags, when a first bag is being filled, a second bag waits near to the filling mouth until the first bag is filled and removed from its filling position, so that there is a time that is lost that is higher the farther the bag waiting to be placed from the filling mouth is.

Description of the invention

[0006] Therefore, one purpose of the present invention is to provide a device for placing bags in a filling mouth in which the time lost for the placement of a bag is reduced, in comparison to the conventional devices for placing bags in a filling mouth.

[0007] With the device according to the present invention it is possible to solve said drawbacks, providing other advantages that are described below.

[0008] According to a first aspect, the present invention refers to a device for placing bags in a filling mouth, comprising:

- a filling mouth that feeds the product to be placed inside the bag;
- hands that hold the bag open an aperture of the bag, wherein the hands are movable between the following positions:
- a collecting position in which the bag is taken already opened.
- a waiting position in which the bag is placed closer to the filling mouth than in the collecting position;
- a filling position in which the bag is transferred to the filling mouth.
- a bag releasing position in which the system frees the bag once it has been taken by the filling mouth clamps.

[0009] Thank to this feature, the bag can be placed closer to the filling mouth of the device when a previous bag is being filled, increasing the productivity of the device.

[0010] Preferably, arms hold and carry the bag in their ends, by hands separable and approachable one to each other when open the bag, before placing in the filling mouth.

[0011] Furthermore, the arms are rotatable with respect to a first rotation axis, wherein the first rotation axis is connected to a second rotation shaft by a pair of connecting arms, and wherein the first rotation axis is connected to a third rotation shaft, the first and third axis are connected by a connecting rod.

[0012] According to an embodiment, the device also comprises grippers that hold the bag sides during the placing into the filling mouth.

[0013] Preferably, each gripper is placed at the end of a respective arm and the grippers are separable and approachable one to each other.

[0014] Furthermore, the grippers or hands and their arms are also rotatable with respect to the first rotation axis.

[0015] According to a preferred embodiment, the connecting rod comprises an intermediate link and two end portions, and preferably, both end portions comprise a free spinning on the levers of the first and third axis.

[0016] Furthermore, one connecting rod end portion is attached to the third rotation axis and the other end portion is attached to the first rotation axis.

[0017] According to a second aspect, the present invention also refers to a method for placing bags in a filling mouth, comprising the following steps:

- collecting a bag in a collecting position;
- moving the bag in a waiting position that is closer to the filling mouth than in the collecting position;
- moving to place the bag in the filling mouth position, in which the bag is taken and hold by the filling mouth clamps; and
- a bag release position in which the hands or grippers release the bag once it has been taken by the filling mouth clamps.

Brief description of the drawings

[0018] For a better understanding the above explanation and for the sole purpose of providing an example, some non-limiting drawings are included that schematically depict a practical embodiment.

Fig. 1 is perspective view of a portion of the device for placing bags in a filling mouth of the present invention, according to a first embodiment;

Fig. 2 is perspective view of a portion of the device for placing bags in a filling mouth of the present invention, according to a second embodiment; and

Fig. 3 is a side elevation view of a portion of the device for placing bags in a filling mouth showing the positions where the arms are placed before the bag filling.

Description of preferred embodiments

[0019] In Fig. 1 a first embodiment of the device according to the present invention is shown, which is preferably used with flat bags.

[0020] The device comprises a filling mouth 1 provided with clamps 10 that feeds the product to be placed inside the bag (not shown in the drawings), and a pair of hands 2 that hold the bag open to be placed on the filling mouth.

[0021] The filling mouth 1 is a conventional mouth and that can be open at its end, or open for bag filling.

[0022] Each hand 2 is placed at end of a respective arm 4, and the hands 2 are separable and approachable to each other. The arms 4 are rotatable with respect to a first rotation axis 6.

[0023] This first rotation axis 6 is connected to a second rotation axis 7 by a pair of connecting arms 11, and to a third rotation axis 8 by a connecting rod 14, comprising a first lever 16 for a third rotation axis 8 and a second lever 15 for the first rotation axis 6.

[0024] As shown in the drawings, the second lever 15 is attached to the first rotation axis 6 and the second lever 16 is attached to the first rotation axis 8.

[0025] These second and first rotation axes 7, 8 are driven by corresponding motors 12, 13. Instead of the motors shown, pneumatic cylinders or another type of drive for the rotation axes 7, 8 can be used.

[0026] In Fig. 2 a second embodiment of the device for placing bags is shown, which is preferably used with bags with gussets.

[0027] For simplicity reasons the same numeral references are used for indicating the same or equivalent elements. Furthermore, these elements will not be described again, because their structure and operation are the same.

[0028] The main difference of this second embodiment with respect to the previous one is that the device also comprises grippers 3 that hold the bag sides during the bag placing process. Between grippers 3, the hands 2 keep the bag open for bag placing.

[0029] Each gripper 3 is placed at end of a respective arm 5, and the grippers 3 are movable to each other and they are also rotatable with respect to the first rotatable axis 6.

[0030] The method for placing bags according to present invention comprises the following steps, and the positions are shown in Fig. 3.

[0031] Firstly, a bag is collected, in a collecting position, indicated by P0 in Fig. 3.

[0032] Once the bag is collected, it is moved and placed in a waiting position, indicated by P1 in Fig. 3.

[0033] As shown in this drawing, this waiting position is closer to the filling mouth 1 than in the collecting position. In this position, the device waits until the filling of a previous bag is finished.

[0034] As shown in Fig. 3, this movement from the collecting position P0 to the waiting position P1 is a rotation movement around the first 6 and third 8 rotation axes.

[0035] Once the previous bag has been removed from the filling mouth 1, the bag from a waiting position P1 is placed in a filling position P2 in Fig. 3, in which the bag is taken by the filling mouth clamps 10, or another method of holding in the filling mouth 1. As shown in Fig. 3, the filling mouth tip is in this position within the bag, which is held by the filling mouth clamps 10 when they close.

[0036] This movement from the waiting position P1 to the filling position P2 is a rotation about the second rotation axis 7 and the third rotation axis 8 driven by a first rotation axis 6.

[0037] It will also be possible to go from the waiting position P1 to the filling position P2 only by rotating the second rotation axis 7.

[0038] Once the bag is taken by the filling mouth clamps 10 or another holding method, the system is moved to a bag releasing position, indicated by P3 in Fig. 3, in which the system does not interfere with the filling of the bag, and it can return freely to the collecting position P0 to take a new bag.

[0039] Even though reference has been made to a specific embodiment of the invention, it is obvious for a person skilled in the art that the device and method described herein are susceptible to numerous variations and modifications, and that all of the details mentioned can be substituted for other technically equivalent ones without departing from the scope of protection defined by the attached claims.

Claims

1. Device for placing bags in a filling mouth, comprising:

- a filling mouth (1) that feeds the product inside the bag;
- hands (2) that hold and move an empty bag;

characterized in that the hands (2) are movable between the following positions:

- a collecting position (P0) in which the bag is collected;
- a waiting position (P1) in which the bag is placed closer to the filling mouth (1) than in the collecting position;
- a filling position (P2) in which the bag is taken

by filling mouth clamps (10);
- a bag releasing position (P3) in which the system releases the bag once it has been taken by the filling mouth clamps (10).

2. Device according to claim 1, wherein each hand (2) is placed at end of a respective arm (4).

3. Device according to claim 1 or 2, wherein the hands (2) are movable to each other.

4. Device according to anyone of the previous claims, wherein the hands (2) are rotatable with respect to a first rotation axis (6).

5. Device according to claim 4, wherein the first rotation axis (6) is connected to a second rotation axis (7) by a pair of connecting arms (11).

6. Device according to claim 4 or 5, wherein the first rotation axis (6) is connected to a third rotation axis (8) by a connecting rod (14).

7. Device according to claim 1, wherein the device also comprises grippers (3) that hold the bag sides.

8. Device according to claim 7, wherein each gripper (3) is placed at end of a respective arm (5).

9. Device according to claim 7 or 8, wherein the grippers (3) are movable to each other.

10. Device according to claims 4 and 7, wherein the grippers (3) are also rotatable with respect to the first rotatable axis (6).

11. Device according to claim 6, wherein the connecting rod (14) connects a first lever (16) and a second lever (15).

12. Device according to claim 11, wherein the second lever (15) is attached to the first rotation axis (6) and the first lever (16) is attached to the third rotation axis (8).

13. Method for placing bags in a filling mouth, **characterized in that** it comprises the following steps:

- placing a bag in a collecting position (P0);
- placing the bag in a waiting position (P1) that is closer to a filling mouth (1);
- placing a bag in a filling position (P2) in which the bag is taken by the filling mouth (1);
- placing the bag in a releasing position (P3) in which the system releases the bag once it has been taken by the filling mouth (1).

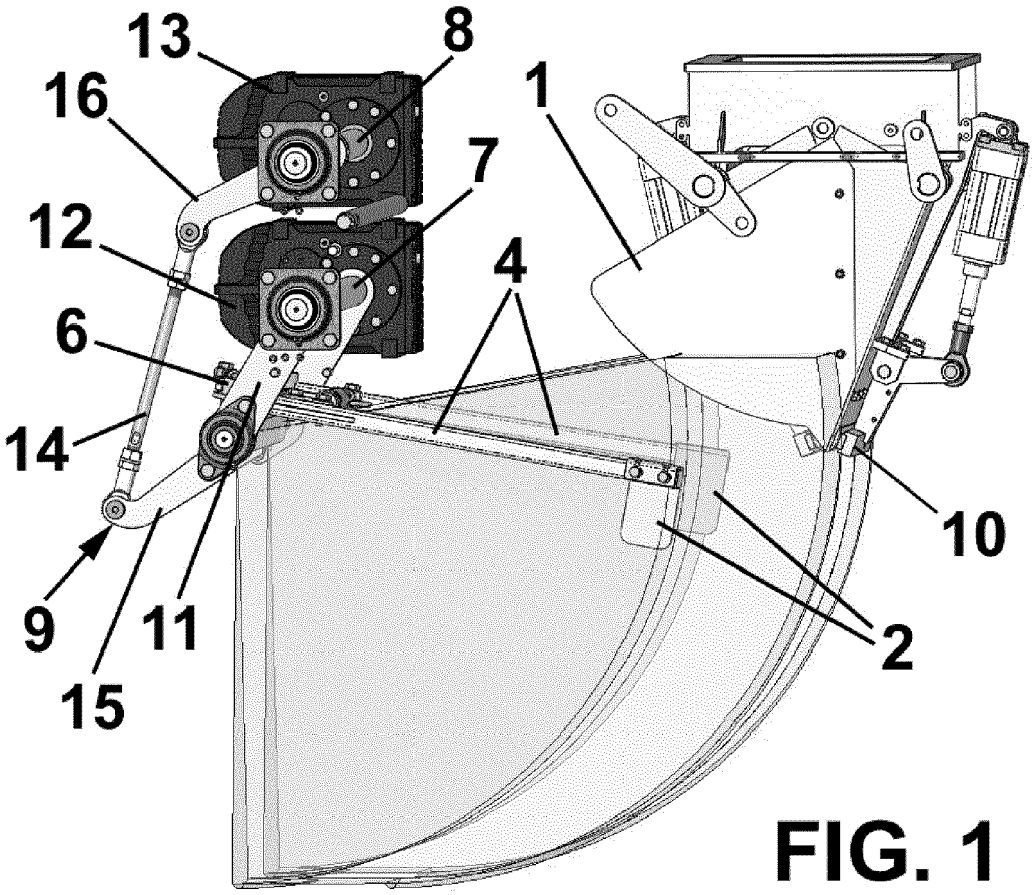

FIG. 1

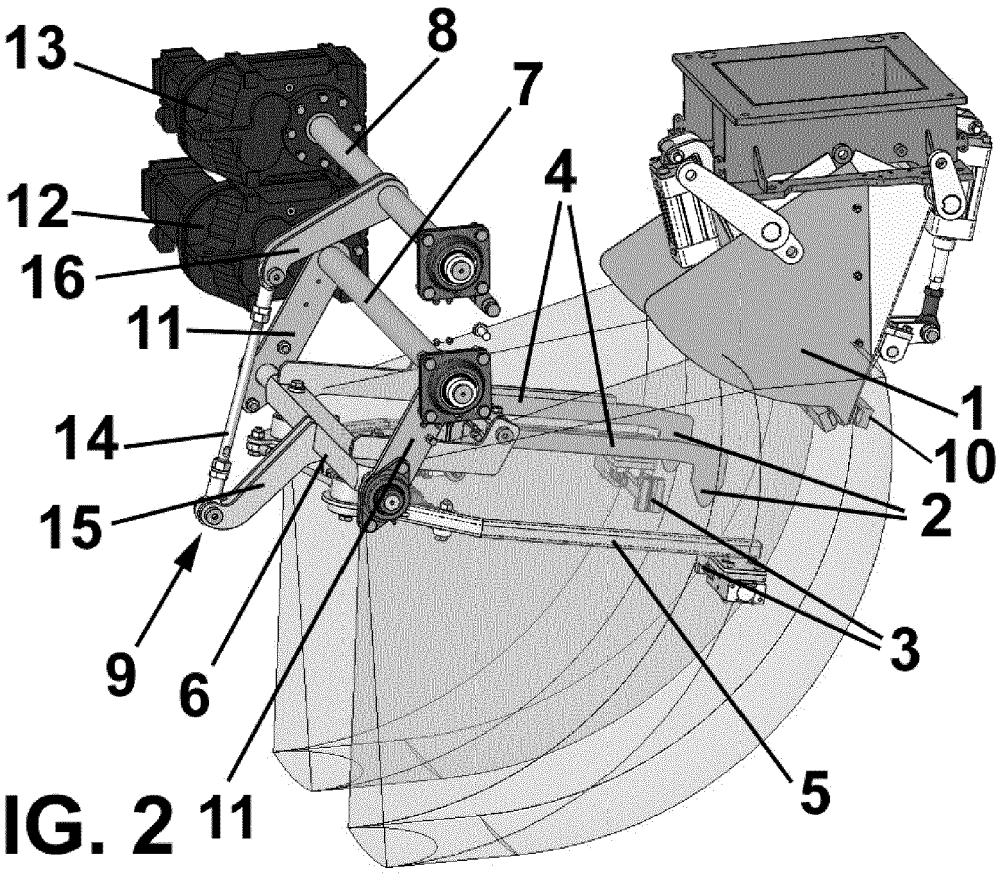

FIG. 2

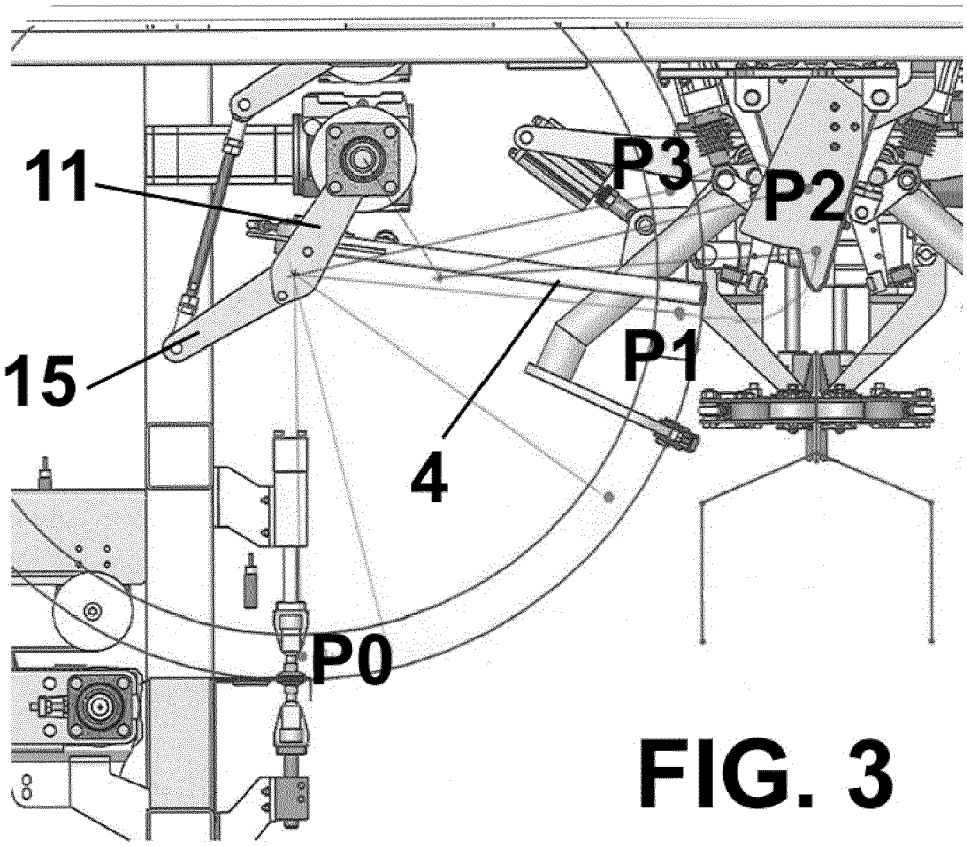

FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 22 38 2303

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	26 September 2022	Ungureanu, Mirela

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 22 38 2303

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82