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(54) **CASE PACKING MACHINE OF VERTICALLY UNSTABLE PACKAGINGS AND CASE PACKING METHOD OF VERTICALLY UNSTABLE PACKAGINGS**

(57) The present invention relates to a case packing machine of vertically unstable packagings which comprises transport means of the packagings, a vertical loading area, a horizontal loading area and loading means, which enables the case packing of said packagings in a vertical position to be carried out inside the corresponding case. Likewise, the machine enables the case packing of said packagings in a horizontal position to be carried out inside said case.

In both modes, the correct positioning of the logo or brand name is ensured independently of the entry position of the packaging. The object of the invention is also a case packing method of vertically unstable packagings that comprises at least one vertical loading step in the corresponding case of the vertically unstable packagings.

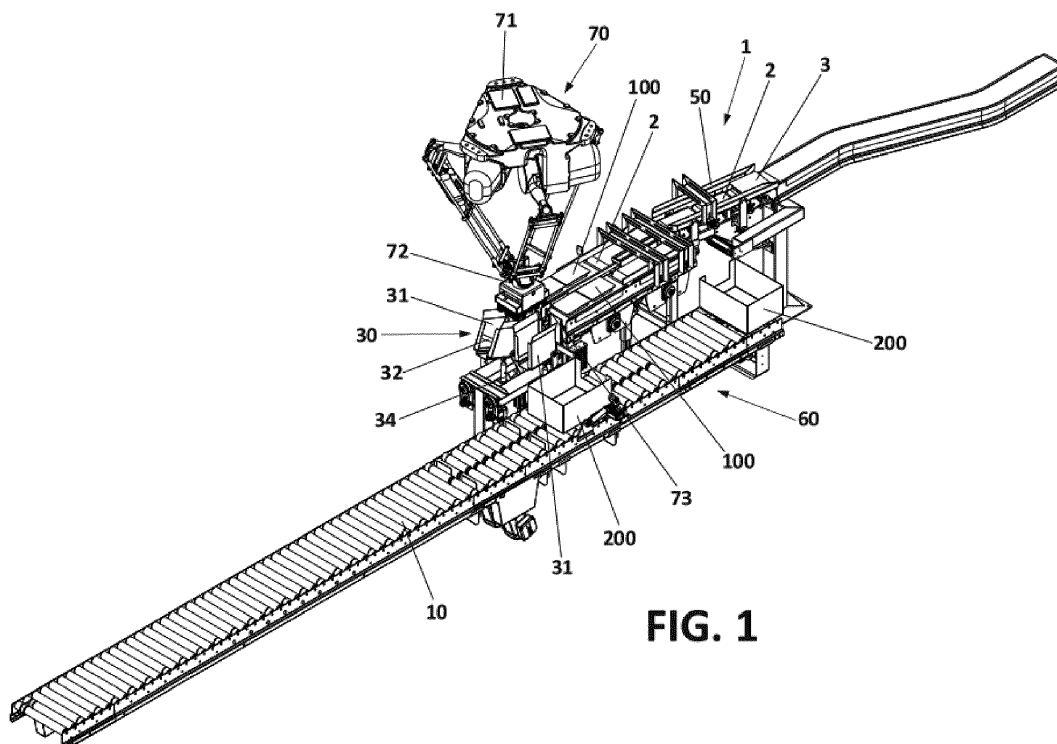


FIG. 1

Description

OBJECT OF THE INVENTION

[0001] The present invention relates to a case packing machine of vertically unstable packagings that comprises transport means of the packagings, a vertical loading area, a horizontal loading area and loading means.

[0002] The object of the invention is a case packing machine of vertically unstable packagings that enables the case packing of said packagings in a vertical position to be carried out inside the corresponding case. Likewise, the machine enables the case packing of said packagings in a horizontal position to be carried out inside said case. In both modes, the correct positioning of the logo or brand name is ensured independent of the entry position of the packaging.

[0003] The object of the invention is also a case packing method of vertically unstable packagings that comprises at least one vertical loading step in the corresponding case of the vertically unstable packagings.

BACKGROUND OF THE INVENTION

[0004] Automatic case packing is the method in which the packaging is introduced into a case or transport container in a planned way and without the direct manual intervention of operators, being able to be carried out with or without computer vision.

[0005] Considering the type of case packing system, the following can be distinguished:

- Case packing machines that introduce the previously assembled packaging into the previously shaped cases. This operation can be carried out in three ways:
 - Lateral case packing: The packagings are placed in the correct packaging arrangement and then they are loaded horizontally into the open case placed on one side thereof. Once the case is full, it is rotated 90° so that the packaging is in a vertical position.
 - Lower case packing: The case vertically moves downwards on the packaging.
 - Upper case packing: The packaging is introduced into the case by means of gripping equipment.
- Wrap-around machines, where the case is shaped around the packaging.

[0006] The case packing machines in a vertical position existing in the state of the art are for stable packagings in said vertical position, such as cases, bottles and even chocolate bars, or for flexible bags that adopt a stable position once placed inside the case.

[0007] There are other high speed systems for the hor-

izontal case packing of the packagings, which are based on the use of computer vision to locate the position and recognize the shape of the packaging at high speeds, for the purpose of loading and/or positioning the disordered packagings. Said packagings are loaded one by one by means of a spider-type robot with a fast working rate has a clamp with suction cups for the purpose of packing the cases horizontally inside the case.

[0008] The applicant is not aware of the existence of case packing machines of vertically unstable packagings nor case packing methods of vertically unstable packagings, according to how the case packing is carried out, as described in the present invention.

DESCRIPTION OF THE INVENTION

[0009] The present invention relates to a case packing machine of vertically unstable packagings that enables the case packing of said packagings in a vertical position to be carried out inside the corresponding case. Likewise, the machine enables the case packing of said packagings in a horizontal position to be carried out inside said case. In both modes, the correct positioning of the brand name is ensured independently of the entry position of the packaging.

[0010] Vertically unstable packaging is understood as the packaging that is not able to remain in a vertical position without the presence of external fastening means.

[0011] The case packing machine of vertically unstable packagings comprises transport means of the vertically unstable packagings, transport means of cases where the vertically unstable packagings are packed and at least one vertical loading area configured to carry out case packing of the vertically unstable packagings in the cases, the vertically unstable packagings in a vertical position being arranged inside said cases.

[0012] The at least one vertical loading area comprises positioning means of the vertically unstable packagings, positioning means that are rotatable from an essentially horizontal position to an inclined position with respect to the vertical or an essentially vertical position and they are configured to position the packagings from an essentially horizontal position to an inclined position with respect to the vertical or an essentially vertical position.

[0013] Henceforth, when packaging alone is mentioned in the present specification, it will be understood that a vertically unstable packaging is mentioned in order to simplify the wording.

[0014] Optionally, the case packing machine of vertically unstable packagings comprises distribution means of the packagings that are configured to distribute the packagings to the transport means of the packagings.

[0015] Optionally, the case packing machine of vertically unstable packagings comprises first loading means configured to carry out the case packing of the packagings in the cases, from the inclined position with respect to the vertical or the essentially vertical position of the packagings positioned by means of the positioning

means, to the vertical position of the packagings inside the cases.

[0016] Optionally, the case packing machine of vertically unstable packagings comprises at least one horizontal loading area configured to carry out case packing of the packagings in the cases, the packagings in a horizontal position being arranged inside said cases. In this case, and preferably, the case packing machine of vertically unstable packagings comprises second loading means configured to carry out the case packing of the packagings from a horizontal position of the packagings to a horizontal position of the packagings inside the cases.

[0017] Optionally, the case packing machine of vertically unstable packagings comprises at least two vertical loading areas and/or two horizontal loading areas, and the transport means of the vertically unstable packagings comprise distribution means of the packagings that distribute the packagings to one of the at least two vertical loading areas and/or to one of the at least two horizontal loading areas.

[0018] Optionally, the at least one vertical loading area comprises positioning means of the cases, positioning means that position the cases from an essentially horizontal position to an inclined position with respect to the vertical or an essentially vertical position.

[0019] The invention also relates to a case packing method of vertically unstable packagings that enables the case packing of said packagings in a vertical position to be carried out inside the corresponding case. Likewise, the method enables the case packing of said packagings in a horizontal position to be carried out inside said case.

[0020] The case packing method of vertically unstable packagings comprises a transport step of the vertically unstable packagings, a transport step of cases where the vertically unstable packagings are packed and at least one vertical loading step where case packing of the vertically unstable packagings is carried out in the cases, the vertically unstable packagings in a vertical position being arranged inside said cases.

[0021] The vertical loading step comprises a positioning sub-step of the vertically unstable packagings where the packagings are rotated from an essentially horizontal position to an inclined position with respect to the vertical or an essentially vertical position.

[0022] Optionally, the method comprises a horizontal loading step where case packing of the packagings is carried out in the cases, the packagings in a horizontal position being arranged inside said cases.

[0023] Optionally, the transport step comprises a distribution sub-step of the packagings prior to the vertical loading step and/or the horizontal loading step.

[0024] Optionally, the method comprises a positioning sub-step of the cases where the positioning of the cases is carried out from an essentially horizontal position to an inclined position with respect to the vertical or an essentially vertical position.

[0025] Thus, the case packing machine of vertically

unstable packagings and the case packing method of vertically unstable packagings resolve the following drawbacks:

- 5 • They enable the arrangement of the vertically unstable packaging in a vertical position in the case, which enables the packaging to be correctly shown to the consumer if the case is also a display case.
- 10 • They make it possible to carry out the case packing of the packagings at a high production rate, approximately 160 packagings/min or 18 cases/min.
- They enable the correct positioning of the logo or brand name of the packaging in the display case for the correct viewing by the consumer.
- 15 • They enable stacking of the vertically unstable packagings to be carried out due to the pressure that some packagings exert on others when packed into the case.
- They enable the packing of vertically unstable packagings to be carried out in which the product contained inside the packaging can have a non-homogeneous distribution.
- 20 • They enable the loading of the packagings inside the cases to be carried out without deforming and/or crushing them.
- 25 • They eliminate the variable associated with the rotation of the packaging with respect to its longitudinal axis during the movement thereof.
- They avoid positioning problems of the packaging due to the temperature that it can have.
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BRIEF DESCRIPTION OF THE DRAWINGS

[0026] As a complement to the description provided herein and for the purpose of helping to make the characteristics of the invention more readily understandable, in accordance with a preferred practical embodiment thereof, said description is accompanied by a set of drawings constituting an integral part of the same, which by way of illustration and not limitation represent the following:

Figure 1 shows a perspective view of the case packing machine of vertically unstable packagings object of the present invention.

Figure 2 shows a perspective view of two vertical loading areas and two horizontal loading areas of the case packing machine of vertically unstable packagings of the present invention.

Figure 3 shows a perspective view of the case packing method of vertically unstable packagings object of the present invention when the vertical loading step is carried out.

Figure 4 shows an elevation view of the case packing method of vertically unstable packagings object of the present invention when the horizontal loading step is carried out.

Figure 5 shows a plan view of Figure 4.

PREFERRED EMBODIMENT OF THE INVENTION

[0027] The case packing machine of vertically unstable packagings of the present invention is described in detail below.

[0028] The case packing machine of vertically unstable packagings, where in this exemplary embodiment the vertically unstable packaging is a plastic packaging (100) for sliced products, comprises transport means (1) of the packagings (20), preferably being one or several conveyor belts (2), transport means (10) of cases (200) where the packagings (100) are packed and at least one vertical loading area (30) configured to carry out packing of the packagings (100) in the cases (200), the packagings (100) in a vertical position being arranged inside said cases (200).

[0029] In this preferred exemplary embodiment, the machine comprises two vertical loading areas (30), each one of which comprises positioning means (31, 32, 33, 34, 35) of the packagings (100), positioning means (31, 32, 33, 34, 35) that are rotatable from an essentially horizontal position to an inclined position with respect to the vertical or an essentially vertical position and are configured to position the packagings (100) from an essentially horizontal position to an inclined position with respect to the vertical or an essentially vertical position.

[0030] The machine comprises first loading means (40) configured to carry out the case packing of the packagings (100) in the cases (200), from the inclined position with respect to the vertical or the essentially vertical position of the packagings (100) positioned by means of the positioning means (31, 32, 33, 34, 35), to the vertical position of the packagings (100) inside the cases (200). Preferably, the first loading means (40) comprise a robot (41) preferably of an anthropomorphic type or spider type and a vertical loading clamp (42) which in turn comprises gripping means (43) of at least one packaging (100).

[0031] Preferably, the positioning means (31, 32, 33, 34, 35) comprise drawers (31) that are rotatable from the essentially horizontal position to the inclined position with respect to the vertical or the essentially vertical position.

[0032] Furthermore, the drawers (31) are rotatable in a clockwise and counterclockwise direction with respect to a transverse axis in a forward direction of the packagings (100) in the transport means (1). Thus, the first loading means (40) can collect the packagings (100) on both sides of the drawers (31), depending on the required orientation of the packaging in the case (200), for the correct display thereof, independently of the entry position of the packaging (100) in the drawer (31).

[0033] Thus, each of the drawers (31) of the two vertical loading areas (30) is alternatively loaded with packagings (100), enabling the alternative operation of the first loading means (40) on one drawer (31) or another, which doubles the working rate of the machine.

[0034] Furthermore, the drawers (31) comprise a vertically movable horizontal plate (32) that limits the fall of the packagings (100) inside the drawer (31) and favours

the correct positioning thereof. Likewise, the drawers (31) comprise upper lateral flanges (33) that favour the correct positioning thereof.

[0035] The drawers (31) comprises first pneumatic pistons (34) and connecting rods (35) that enable the rotation of the same (31) to be carried out in a clockwise and counterclockwise direction and ensure the entry of the first loading means (40) on both sides of the drawer (31), without interfering with the transport means (1) of the packagings (100).

[0036] The machine comprises two horizontal loading areas (60) configured to carry out case packing of the packagings (100) in the cases (200), the packagings (100) in a horizontal position being arranged inside said cases (200).

[0037] The machine further comprises distribution means (50) of the packagings that are configured to distribute the packagings (100) to the transport means (1) of the packagings, preferably to a vertical loading area (30) or another area (30) and thus enable the collection of the packagings in one drawer (31) or another and/or to a horizontal loading area (60) or another area (60).

[0038] The machine comprises second loading means (70) configured to carry out the case packing of the packagings (100) from a horizontal position of the packagings (100) to a horizontal position of the packagings (100) inside the cases (200). Preferably, the second loading means (70) comprise a robot (71) preferably of an anthropomorphic type or spider type and a horizontal loading clamp (72) which in turn comprises fastening means (73), preferably a set of suction cups, of at least one packaging (100).

[0039] At least one of the vertical loading areas (30) comprises positioning means (80) of the cases (200), positioning means (80) that position the cases (200) from an essentially horizontal position to an inclined position with respect to the vertical or an essentially vertical position.

[0040] Preferably, the positioning means (80) of the cases (200) comprise holding means (81) of the cases (200), preferably suction cups, horizontal placement means (82) of the cases (200), preferably a second pneumatic piston, and rotation means (83) of the cases (200), preferably a third pneumatic piston.

[0041] The transport means (1) of the packagings (20) comprise braking means (3) of the packagings (100) that prevent the stacking of the packagings (100) along the transport means (1).

[0042] In this exemplary embodiment, the case packing method of vertically unstable packagings (100), preferably plastic packagings (100) for sliced products, comprises a transport step of the packagings, a transport step of cases where the packaging are packed and two vertical loading steps where case packing of the packagings (100) is carried out in the cases (200), the packagings (100) in a vertical position being alternatively arranged inside said cases (200), as described above for the machine.

[0043] The vertical loading step comprises a positioning sub-step of the packagings (100) where the rotation of the packagings (100) is carried out from an essentially horizontal position to an inclined position with respect to the vertical or an essentially vertical position.

[0044] The method comprises a distribution step of the packagings prior to the vertical loading step and/or the horizontal loading step.

[0045] The method comprises a horizontal loading step where case packing of the packagings (100) is carried out in the cases (200), the packagings (100) in a horizontal position being arranged inside said cases (200).

[0046] The method comprises a positioning sub-step of the cases (200) where the positioning of the cases (200) is carried out from an essentially horizontal position to an inclined position with respect to the vertical or an essentially vertical position.

Claims

1. A case packing machine of vertically unstable packagings which comprises transport means (1) of the vertically unstable packagings (100), transport means (10) of cases (200) where the vertically unstable packagings (100) are packed and at least one vertical loading area (30) configured to carry out case packing of the vertically unstable packagings (100) in the cases (200), the vertically unstable packagings (100) in a vertical position being arranged inside said cases (200), **characterized in that** the at least one vertical loading area (30) comprises positioning means (31, 32, 33, 34, 35) of the vertically unstable packagings (100), positioning means (31, 32, 33, 34, 35) that are rotatable from an essentially horizontal position to an inclined position with respect to the vertical or an essentially vertical position and are configured to position the packagings (100) from an essentially horizontal position to an inclined position with respect to the vertical or an essentially vertical position.
2. The case packing machine of vertically unstable packagings according to claim 1, **characterized in that** it comprises first loading means (40) configured to carry out the case packing of the packagings (100) in the cases (200), from the inclined position with respect to the vertical or the essentially vertical position of the packagings (100) positioned by means of the positioning means (31, 32, 33, 34, 35), to the vertical position of the packagings (100) inside the cases (200), where the first loading means (40) preferably comprise a robot (41), preferably of an anthropomorphic type or spider type, and a vertical loading clamp (42) which in turn comprises gripping means (43) of at least one packaging (100).

3. The case packing machine of vertically unstable packagings according to any of the preceding claims, **characterized in that** the positioning means (31, 32, 33, 34, 35) comprise drawers (31) that are rotatable from the essentially horizontal position to the inclined position with respect to the vertical or the essentially vertical position.
4. The case packing machine of vertically unstable packagings according to claim 3, **characterized in that** the drawers (31) are rotatable in a clockwise and counterclockwise direction with respect to a transverse axis in a forward direction of the packagings (100) in the transport means (1).
5. The case packing machine of vertically unstable packagings according to any of claims 3 or 4, **characterized in that** the drawers (31) comprise a vertically movable horizontal plate (32) that limits the fall of the packagings (100) inside the drawer (31) and favours the correct positioning thereof and/or upper lateral flanges (33) that favour the correct positioning thereof.
6. The case packing machine of vertically unstable packagings according to any of the preceding claims, **characterized in that** it comprises at least one horizontal loading area (60) configured to carry out case packing of the packagings (100) in the cases (200), the packagings (100) in a horizontal position being arranged inside said cases (200).
7. The case packing machine of vertically unstable packagings according to claim 6, **characterized in that** it comprises second loading means (70) configured to carry out the case packing of the packagings (100) from a horizontal position of the packagings (100) to a horizontal position of the packagings (100) inside the cases (200), where the second loading means (70) preferably comprise a robot (71), preferably of an anthropomorphic type or spider type, and a horizontal loading clamp (72) which in turn comprises fastening means (73), preferably a set of suction cups, of at least one packaging (100).
8. The case packing machine of vertically unstable packagings according to any of the preceding claims, **characterized in that** it comprises two vertical loading areas (30).
9. The case packing machine of vertically unstable packagings according to claim 8, **characterized in that** it comprises two horizontal loading areas (60).
10. The case packing machine of vertically unstable packagings according to claim 9, **characterized in that** it comprises distribution means (50) of the packagings (100) that are configured to distribute the

packagings (100) to the transport means (1) of the packagings, preferably to a vertical loading area (30) or another area (30) and/or to a horizontal loading area (60) or another area (60).

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11. The case packing machine of vertically unstable packagings according to any of the preceding claims, **characterized in that** at least one of the vertical loading areas (30) comprises positioning means (80) of the cases (200), positioning means (80) that position the cases (200) from an essentially horizontal position to an inclined position with respect to the vertical or an essentially vertical position, where the positioning means (80) of the cases (200) preferably comprise holding means (81) of the cases (200), preferably suction cups, horizontal placement means (82) of the cases (200), preferably a second pneumatic piston, and rotation means (83) of the cases (200), preferably a third pneumatic piston.
12. The case packing machine of vertically unstable packagings according to any of the preceding claims, **characterized in that** the transport means (1) of the packagings (20) comprise braking means (3) of the packagings (100) that prevent the stacking of the packagings (100) along the transport means (1).
13. A case packing method of vertically unstable packagings (100) which comprises a transport step of the packagings (100), a transport step of cases (200) where the packaging (100) are packed and at least one vertical loading step where case packing of the packagings (100) is carried out in the cases (200), the packagings (100) in a vertical position being arranged inside said cases (200), **characterized in that** the vertical loading step comprises a positioning sub-step of the packagings (100) where the rotation of the packagings (100) is carried out from an essentially horizontal position to an inclined position with respect to the vertical or an essentially vertical position.
14. The case packing method of vertically unstable packagings (100) according to claim 13, **characterized in that** it comprises a horizontal loading step where case packing of the packagings (100) is carried out in the cases (200), the packagings (100) in a horizontal position being arranged inside said cases (200).
15. The case packing method of vertically unstable packagings (100) according to any of claims 13 or 14, **characterized in that** it comprises a positioning sub-step of the cases (200) where the positioning of the cases (200) is carried out from an essentially horizontal position to an inclined position with respect to the vertical or an essentially vertical position.

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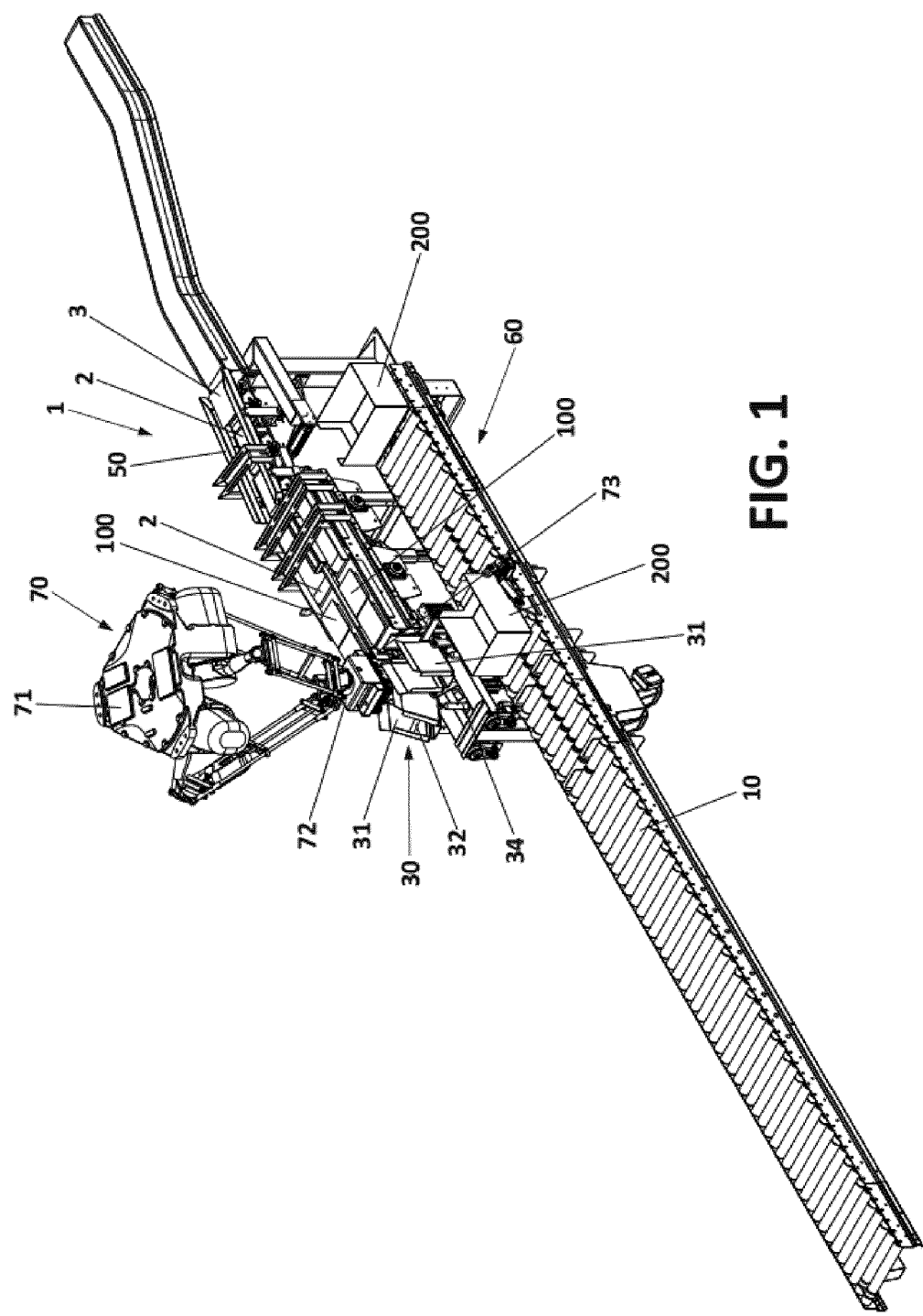


FIG. 1

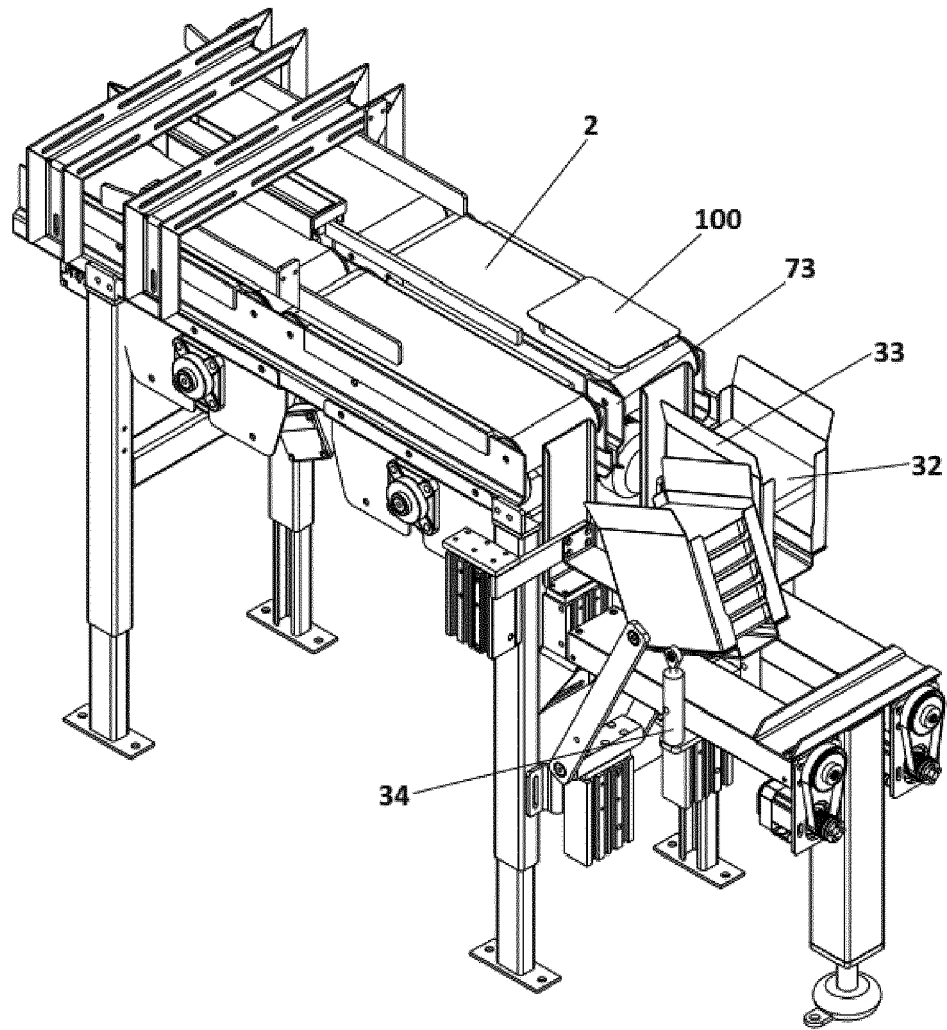


FIG. 2

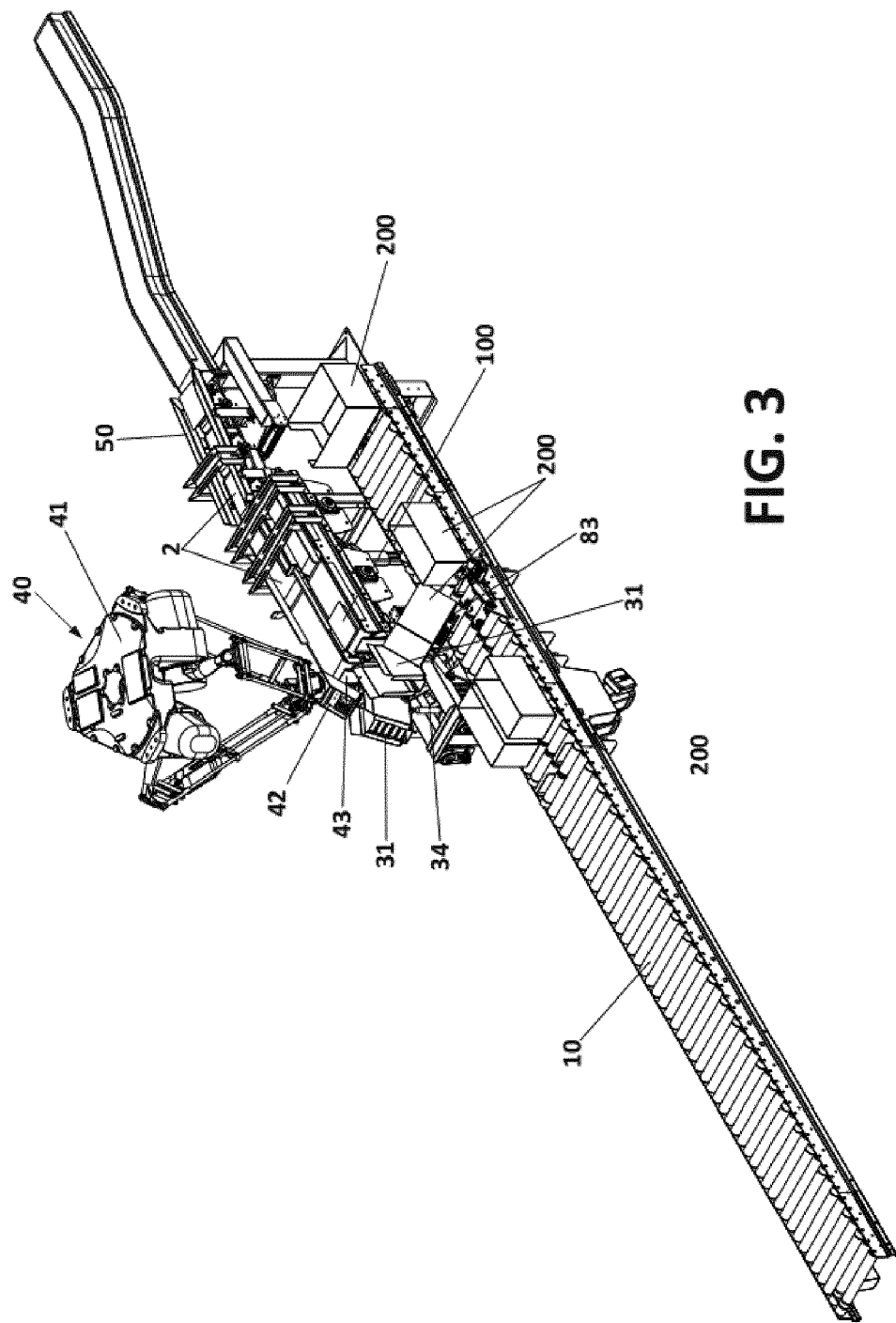


FIG. 3

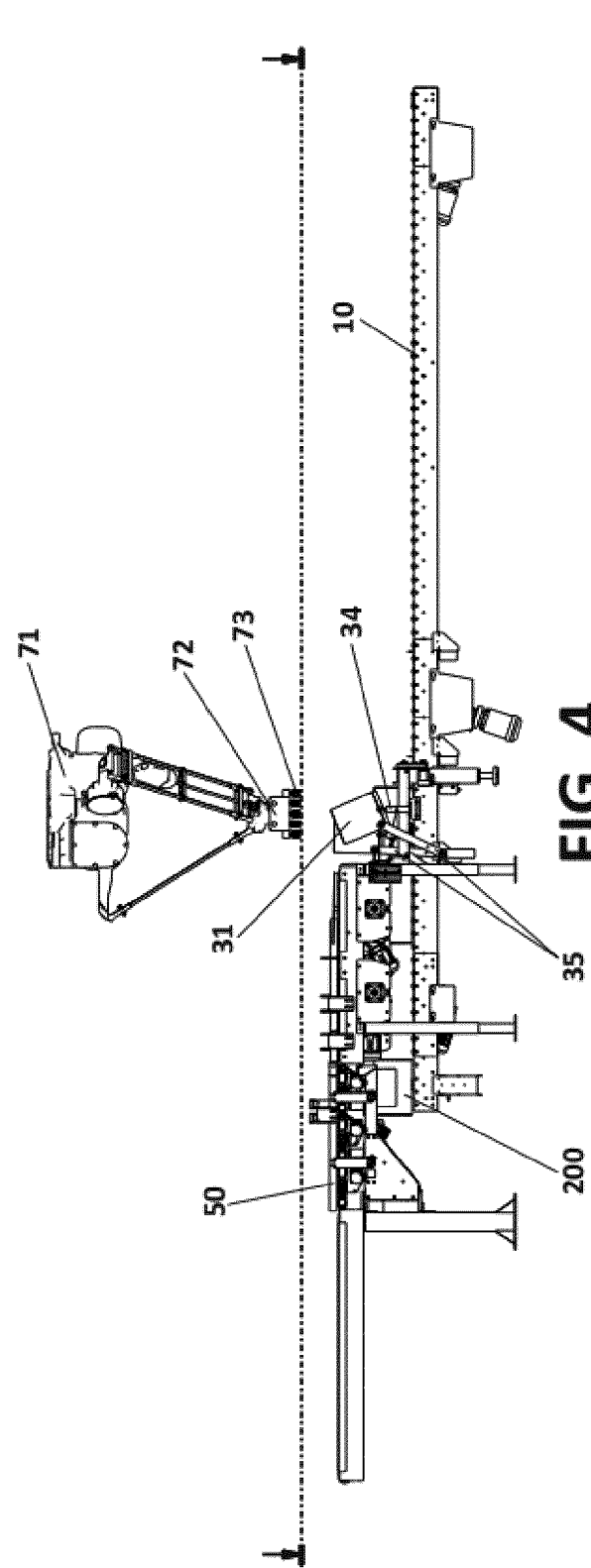


FIG. 4

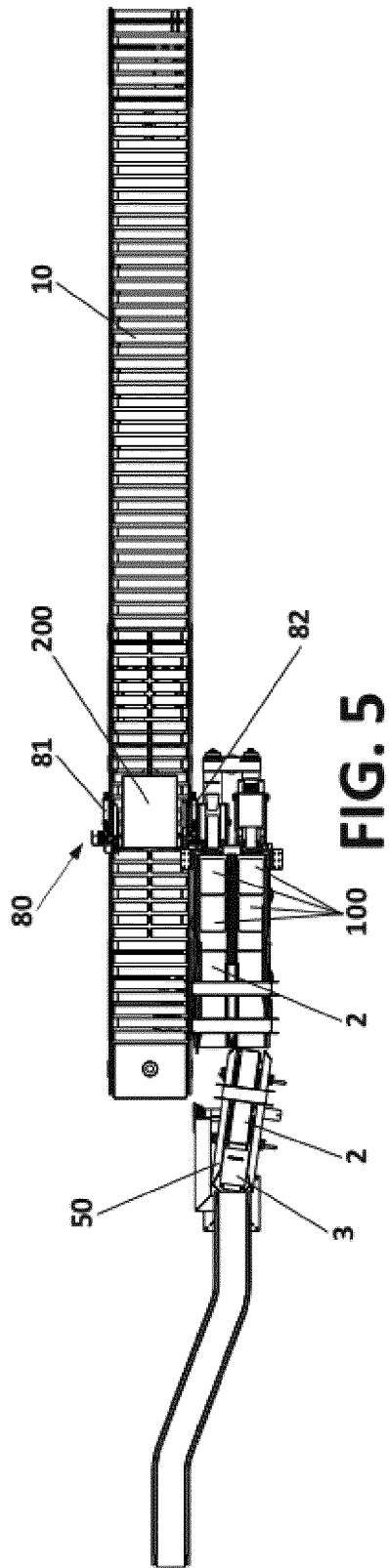


FIG. 5



EUROPEAN SEARCH REPORT

 Application Number
 EP 18 38 2062

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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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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 10 October 2018	Examiner Yazici, Baris
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	

EPO FORM 1503 03.82 (P04C01)



Application Number

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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☒ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

1-7, 13, 14

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



LACK OF UNITY OF INVENTION
SHEET B

Application Number

EP 18 38 2062

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1, 2, 6, 7, 13, 14

first and second loading means comprising a robot with gripping means for at least one package.

2. claims: 3-5

drawers that are rotatable from an essentially horizontal position to the inclined position with a vertically movable horizontal plate that limits the fall of the packages.

3. claims: 8-10

multiple horizontal and vertical loading areas.

4. claims: 11, 15

positioning means for cases.

5. claim: 12

breaking means for the packages.

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 18 38 2062

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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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