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(54) **MULTIFORMAT BOX CLOSING MACHINE AND MULTIFORMAT BOX CLOSING METHOD**

(57) The present invention relates to a multiformat box closing machine, starting from open boxes loaded with products, which comprises loading means, glueing means and closing means, wherein the machine allows for the closing of boxes that comprise at least one flap, or one upper side, and at least one support flange, for any cardboard box format, all with the same machine, without the need to change the orientation of the box during the closing thereof and at a higher speed than existing multiformat box closing machines, thereby saving stoppage times and the costs associated thereto, as well as to a multiformat closing method for boxes that comprise at least one flap, or one upper side, and at least one support flange, for any cardboard box format.

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Description

OBJECT OF THE INVENTION

[0001] The present invention relates to a multiformat box closing machine, which starts from open boxes loaded with products, and comprises loading means, glueing means and closing means.

[0002] The object of the invention is a multiformat box closing machine which allows for closing boxes that comprise at least one flap, or one upper side, and at least one support flange, for any cardboard box format, all with the same machine, without the need to change the orientation of the box during the closing thereof and at a higher speed than existing multiformat box closing machines, thereby saving stoppage times and the costs associated thereto.

[0003] The object of the invention is also a multiformat closing method for boxes that comprise at least one flap, or one upper side, and at least one support flange, for any cardboard box format, which has the aforementioned advantages.

BACKGROUND OF THE INVENTION

[0004] Cardboard boxes are a widely used medium for the storage, transport and distribution of all types of products. Manufacturing and distribution companies use cardboard boxes to package their products in packing units for the subsequent storage, transport and distribution thereof.

[0005] Currently, the method for closing partially formed cardboard boxes is performed in forming machines and closing machines, which are integrated into the product manufacturing method; for this reason, manufacturing industries have their own means for forming and closing boxes, according to their needs in regards to formats and quantities, as we will explain below.

[0006] In general, box forming machines are equipped with a loader that dispenses, one by one, the die-cut sheets to the shaping area, where a number of automatisms fold the perimetral flanges of the sheets, in order to obtain the bottom and the lateral walls of the box, and subsequently glue them.

[0007] Once the partially formed box leaves the forming machine, it is filled with the product to be transported and, thereafter, is transferred to a closing machine that closes the box, in order to complete the forming thereof and allow for subsequent transport.

[0008] Box closing is a simple method that is often not given the importance that it deserves, since a poorly-closed box, with overlapping flaps, may affect the stability of a pallet, and eventually ruin a load during transport. Well-closed boxes make it possible to increase stacking levels in the truck and reduce transport costs, and, moreover, improves the image of the company in the eyes of its clients.

[0009] Three primary types of box closing machines have been disclosed:

- Closing machines for boxes with flaps: the machine closes the flaps, which are shaped by extending the cardboard from the side, thereby creating a flap on each side of the box, by means of an automatic in-line method, wherein the box filled with product moves on a conveyor belt or is manually placed at the infeed of the closing machine and, thereafter, the upper flaps of the box are opened by means of a chain conveyor and rods, in order to allow for the injection of hotmelt glue in parallel lines using an applicator nozzle. Subsequently, forming guide rails placed on the upper part and on the lower part fold and close the upper flaps of the box. The method is controlled by means of an electronic encoder that accurately detects the point where the hotmelt glue is to be injected. The yield is 15 boxes/min and the box loading speed is variable. Variants of these machines have been disclosed which allow for the simultaneous closing of the upper and lower flaps by means of two glue applicators with a nozzle. These include patent ES8100642A1. Moreover, these types of closing machines allow for the closing of boxes with different widths and/or heights and/or lengths. However, in these machines, the application of glue to the flaps may cause said glue to fall on the product inside the box if there is a gap between the forward movement of the box and the dispensing of glue by means of the applicator nozzle.
- Closing machines for boxes with tongues: the machine closes the tongues, which are flanges placed adjacent to the edges of the upper side or the lateral sides of the box, by means of a closing method by glueing, wherein one or several tongues of the upper side are fixed to the inner or the outer part of the lateral sides and/or wherein one or several upper tongues of the lateral sides are fixed to the inner or the outer part of the upper side. Preferably, the number of tongues is three, and the box is of the wrap-around type. The yield is 20 boxes/min and the box loading speed may be variable. These include patent ES8100195A1.
- Closing machines for boxes with a separate lid: the machine closes the lid, which is obtained from a die-cut cardboard sheet independent from the die-cut cardboard sheet from which the body of the box is formed, and places it over the body of the box by means of glueing or tightening.

[0010] In the types of machines described above, the application of glue is performed by means of nozzles that remain fixed whilst the box moves forward on the machine, thereby creating one or several glue strings in the forward direction of movement of the box.

[0011] However, in all the types of machines described above, due to its location adjacent to the position of the product, the application of glue to the flaps, the flanges

or the sides of the box may cause said glue to fall on the product inside the box if there is a gap in the longitudinal direction or a misalignment in the transverse direction between the box and the applicator nozzle.

[0012] The applicant is not aware of the existence of any multiformat box closing machines which allow for the closing of boxes that simultaneously comprise flaps and support flanges for any cardboard box format, or methods for closing said boxes, without the risk of glue falling on the product inside the box.

DESCRIPTION OF THE INVENTION

[0013] The present invention relates to a multiformat box closing machine which allows for the closing of boxes that comprise at least one flap, or one upper side, and at least one support flange, for any cardboard box format, all with the same machine, without the need to change the orientation of the box during the closing thereof, and at a higher speed than existing multiformat box closing machines, thereby saving stoppage times and the costs associated thereto.

[0014] The multiformat box closing machine performs the closing starting from open boxes loaded with products, and the machine comprises box loading means, box glueing means and box closing means.

[0015] Optionally, the loading means comprise at least a set of box positioning means in a forward direction of movement towards the closing means, which makes it possible to increase the box closing speed.

[0016] The closing means comprise at least one upper blade configured to perform the closing of the flap(s), or the upper side, and at least one lateral blade configured to perform the closing of the support flange(s).

[0017] The glueing means comprise at least one first glue gun configured to apply glue to the support flange(s) with the flap(s), or the upper side, in an open position.

[0018] In this way, it is possible to perform the closing of the flap(s), or the upper side, and the support flange(s) after applying the glue to the support flange(s) outside the product area, which eliminates the risk of glue falling on said product.

[0019] Preferably, the first glue gun(s) configured to apply glue to the support flange(s) with the flap(s), or one upper side, and the support flange(s) in the open position is(are) configured to apply glue to the support flange(s) with the flap(s), or the upper side, and the support flange(s) in a vertical position.

[0020] Optionally, the first glue gun(s) configured to apply glue to the support flange(s) with said support flange(s) in the open position comprise(s) guiding means designed to place the flap(s), or the upper side, and the support flange(s) in the open position.

[0021] Preferably, the first glue gun(s) comprise(s) a set of product relocating means, in case that the height of the products exceeds that of the box, which actuate prior to the application of glue by means of the first glue gun(s).

[0022] The closing means comprise a first set of actuating means designed to perform the displacement of the upper blade(s) from a first rest position to a second position for the closing of the flap(s), or the upper side, and a second set of actuating means designed to perform the displacement of the lateral blade(s) from a first rest position to a second position for the closing of the support flange(s).

[0023] Optionally, the glueing means comprise at least one second glue gun configured to apply glue to the flap(s), or the upper side of the box, once said box has been closed, thereby guaranteeing stability of the boxes when they are stacked.

[0024] Optionally, the second glue gun(s) configured to apply glue to the flap(s), or the upper side of the box, once said box has been closed comprise(s) means for detecting the open position of the flap(s), or the upper side, and the support flange(s) once the box has been closed by means of the closing means, which prevents the glue applied by means of the second glue gun(s) configured to apply glue to the flap(s), or the upper side of the box, once said box has been closed from applying glue to the product due to incorrect closing of the box.

[0025] Optionally, the multiformat box closing machine comprises detection means configured to determine whether or not the placement of the flap(s), or the upper side of the box, and the support flange(s) is correct once the closing means have actuated on the box, which prevents the application of glue to the product placed inside the box by the second glue gun(s), by expelling the box from the method, if applicable.

[0026] The multiformat box closing machine further comprises control means, which govern and co-ordinate the various actuating means for the general operation of the machine.

[0027] The present invention also relates to a multiformat closing method for boxes that comprise at least one flap, or one upper side, and at least one support flange, for any cardboard box format, wherein the method performs the closing starting from open boxes loaded with products, which comprises the following steps:

- a box loading step;
- a box glueing step, and
- a box closing step.

[0028] Optionally, the loading step comprises a box positioning substep prior to the closing step, which makes it possible to increase the box closing speed.

[0029] The closing step comprises a transverse closing substep designed to perform the closing of the flap(s), or the upper side, and a longitudinal closing substep designed to perform the closing of the support flange(s).

[0030] The glueing step comprises at least one first substep for applying glue to the support flange(s), with the flap(s), or the upper side, and the support flange(s) in the open position.

[0031] Preferably, the first substep(s) for applying glue

to the support flange(s) with the flap(s), or the upper side, and the support flange(s) in the open position perform(s) the application of glue to the support flange(s) with the flap(s), or the upper side, and the support flange(s) in the vertical position.

[0032] Optionally, the first substep(s) for applying glue to the support flange(s) with the flap(s), or the upper side, and the support flange(s) in the open position comprise(s) a guiding substep designed to place the flap(s), or the upper side, and the support flange(s) in the open position.

[0033] Optionally, the first substep(s) for applying glue to the support flange(s) with the flap(s), or the upper side, and the support flange(s) in the open position comprise(s) a product placement substep, in case that the height of the products exceeds that of the box.

[0034] In the transverse closing substep designed to perform the closing of the flap(s), or the upper side, at least one upper blade is displaced from a first rest position to a second position for the closing of the flap(s), or the upper side, whereas, in the longitudinal closing substep designed to perform the closing of the support flange(s), at least one lateral blade is displaced from a first rest position to a second position for the closing of the support flange(s). In this position, the lateral blade is equipped with a pneumatic cylinder that presses the support flange against the wall in order to fix the glue.

[0035] Optionally, the glueing step comprises at least one second substep for applying glue to the flap(s), or the upper side of the box, once said box has been closed, which guarantees stability of the boxes when they are stacked.

[0036] Optionally, prior to the second substep for applying glue to the flap(s), or the upper side of the box, once said box has been closed, the method comprises a step for detecting an open position of the flap(s), or the upper side, and/or the support flange(s) once the box has been closed in the closing step, in order to prevent the second substep(s) for applying glue to the flap(s), or the upper side of the box.

BRIEF DESCRIPTION OF THE DRAWINGS

[0037] In order to supplement the description being made, and to contribute to a better understanding of the characteristics of the invention, according to a preferred embodiment thereof, a set of drawings is attached to said description as an integral part thereof, where the following is represented for illustrative, nonlimiting purposes:

Figure 1 shows a perspective view of the multiformat box closing machine of the present invention.

Figure 2 shows a top view of Figure 1.

Figure 3 shows a perspective view of the multiformat box closing machine of the present invention when the glue is applied by means of the first glue guns.

Figure 4 shows a top view of the multiformat box closing machine of the present invention when the closing means perform the closing of the flap(s), or the upper side, and the support flange(s).

Figure 5 shows a top view of the multiformat box closing machine of the present invention when the closing means have completed the closing of the flap(s), or the upper side, and the support flange(s).

Figure 6 shows a perspective view of the multiformat box closing machine of the present invention when the glue is applied by means of the second glue guns once the box has been closed.

Figures 7A, 7B and 7C show, respectively, exploded profile (Figure 7A), top (Figure 7B) and perspective (Figure 7C) views of one of the lateral blades and the corresponding actuating means thereof.

PREFERRED EMBODIMENT OF THE INVENTION

[0038] Below we describe in detail the multiformat box closing machine of the present invention.

[0039] Preferably, the multiformat box closing machine allows for closing boxes which comprise two upper flaps (1) that converge at the centre of the box and four support flanges (2), two for each upper flap (1), each of these two support flanges (2) being joined on a lateral folding edge of the upper flaps (1).

[0040] The multiformat box closing machine performs the closing starting from open boxes loaded with products, i.e. with the upper flaps (1) and the support flanges (2) unclosed, wherein the machine comprises box loading means (10, 11, 12, 13, 14, 15, 16), box glueing means (50, 51, 52, 53) and box closing means (100, 101, 102, 103, 104, 105).

[0041] The box loading means (10, 11, 12, 13, 14, 15, 16) comprise box positioning means (11, 12, 13, 14, 15, 16) in a forward direction of movement towards the closing means (100, 101, 102, 103, 104, 105), wherein said positioning means (11, 12, 13, 14, 15, 16) comprise box gripping means (11), preferably vacuum suction cups (11) which are displaced to the box, through a first side thereof, by means of a first actuator (12), and a fitting blade (13) facing the gripping means (11), which is displaced to the box, through a second side thereof opposite to the first side, by means of a second actuator (14), such that the box is placed between the vacuum suction cups (11) and the fitting blade (13), which guarantees a vacuum in the vacuum suction cups (11) and, consequently, correct gripping of the box.

[0042] The positioning means (11, 12, 13, 14, 15, 16) further comprise a displacement motor (15), which displaces the gripping means (11) and the first actuator (12) towards the closing means (100, 101, 102, 103, 104, 105), going through the glueing means (50, 51, 52, 53).

[0043] The box loading means (10, 11, 12, 13, 14, 15, 16) further comprise a forward-movement roller conveyor (10) that collaborates with the positioning means (11, 12, 13, 14, 15, 16), in order for the boxes to slide towards the closing means (100, 101, 102, 103, 104, 105), going through the glueing means (50).

[0044] The positioning means (11, 12, 13, 14, 15, 16) further comprise detection means (16), preferably a photocell placed on the roller conveyor (10), designed to determine that the box to be gripped is facing the gripping means (11).

[0045] Moreover, in order to facilitate the positioning, transverse positioning means are provided, which comprise a retractable stop bar (17) placed between the rollers of the roller conveyor (10). Said stop bar (17) marks the reference position that defines the position and the forward movement of the box.

[0046] The box glueing means (50, 51, 52, 53) comprise two first glue guns (50) configured to apply glue to the four support flanges (2) with the two upper flaps (1) in the vertical position. Preferably, the two first glue guns (50) are placed perpendicular to the forward direction of movement. More preferably, the two first glue guns (50) are staggered, such that each of the glue guns (50) applies glue to two support flanges (2) on each side of the box. With this special configuration of the first glue guns (50), it is possible to apply glue to boxes with a small width.

[0047] The two first glue guns (50) comprise guiding means (51), wherein each of the guiding means (51) of each first glue gun (50) place the upper flaps (1) and the support flanges (2) in the vertical position.

[0048] The two first glue guns (50) further comprise product relocating means (52), in case that the height thereof exceeds that of the box, which actuate prior to the application of glue by means of the two first glue guns (50).

[0049] The two first glue guns (50) are intended to be displaced perpendicularly to the forward direction of movement, such that the glue guns (50), as well as the guiding means (51) and the relocating means (52), may be adjusted to the width of the box. This also guarantees a tolerance between the first glue guns (50) and the upper flaps (1) and support flanges (2).

[0050] The box closing means (100, 101, 102, 103, 104, 105) comprise two upper blades (100) configured to perform the closing of the two upper flaps (1), wherein each of the upper blades (100) closes one upper flap (1), and two lateral blades (101) configured to perform the closing of the four support flanges (2), wherein each of the lateral blades (101) closes two support flanges (2), those placed on the front part or the rear part of the box.

[0051] The closing means (100, 101, 102, 103, 104, 105) comprise a first set of actuating means (102) designed to displace each upper blade (100) from a first rest position to a second position for the closing of the upper flap (1), and a second set of actuating means (103, 104) designed to displace each lateral blade (101) from a first rest position to a second position for the closing of the support flanges (2). The first rest position of each lateral blade (101) is defined above the upper flaps (1) and the support flanges (2) with the upper flaps (1) and the support flanges (2) in the open position, in order to allow for passage of the box through the closing means (100, 101, 102, 103, 104, 105) without interfering with the lateral blades (101).

[0052] The second set of actuating means (103, 104) for the lateral blades (101) comprise a vertical actuator (103), designed to position the lateral blade facing the support flanges (2), and a horizontal actuator (104), designed to close the support flanges (2). The second set of actuating means (103, 104) for the lateral blades comprise support means (105) that rest on the upper flaps (1) prior to actuating the horizontal actuators that perform the closing of the support flanges (2).

[0053] The closing means (100, 101, 102, 103, 104, 105) may be displaced in three directions perpendicular to one another: the forward direction of movement of the boxes and the two directions perpendicular thereto, in order to adjust to the different box lengths, widths and heights.

[0054] The glueing means (50, 51, 52, 53) comprise two second glue guns (53) configured to apply glue to the upper flaps (1), each second glue gun (53) to an upper flap (1) once said box has been closed, which guarantees stability of the boxes when they are stacked.

[0055] The two second glue guns (53) comprise means for detecting (54) the open position of the upper flap (1) or the support flanges (2) once the box has been closed by the closing means (100, 101, 102, 103, 104, 105), which prevents the second glue guns (53) from applying glue to the product due to incorrect closing of the box.

[0056] Preferably, these means for detecting (54) the open position of the upper flap (1) or the support flanges (2) are photocells.

[0057] The closing means (100, 101, 102, 103, 104, 105), as well as the first (50) and the second (53) glue guns, and the detection means (54), may be jointly displaced in the two directions perpendicular to the forward direction of movement of the boxes, such that the change for the different box formats is performed quickly and automatically.

[0058] The multiformat box closing machine further comprises control means that govern and co-ordinate the various actuating means (102, 103, 104) for the general operation of the machine.

[0059] The multiformat closing method for boxes which comprise two upper flaps (1) that converge at the centre of the box and four support flanges (2), two for each upper flap (1), each of these two support flanges (2) being joined at a folding lateral edge of the upper flaps (1), for any cardboard box format, wherein the method performs the closing starting from open boxes loaded with products, comprises the following steps:

- a box loading step;
- a box glueing step, and
- a box closing step.

[0060] The loading step comprises a box positioning substep prior to the closing step.

[0061] The closing step comprises a transverse clos-

ing substep, designed to perform the closing of the upper flaps (1), and a longitudinal closing substep, designed to perform the closing of the support flanges (2).

[0062] The glueing step comprises two first substeps for the application of glue to the support flanges (2) with the upper flaps (1) and the support flanges (2) in the vertical position, wherein, in each of the substeps, glue is applied to two support flanges (2), one on each side of the box.

[0063] The substeps for the application of glue to the support flanges (2) with the upper flaps (1) and the support flanges (2) in the vertical position comprise a guiding substep designed to place the upper flaps (1) and the support flanges (2) in the vertical position and, optionally, a product placement substep, in case that the height of the products exceeds that of the box, prior to the application of glue.

[0064] In the transverse closing substep designed to perform the closing of the upper flaps (1), two upper blades (100) are displaced from a first rest position to a second position for the closing of the upper flaps (1), whereas, in the longitudinal closing substep, designed to perform the closing of the support flanges (2), two lateral blades (101) are displaced from a first rest position to a second position for the closing of the support flanges (2).

[0065] The glueing step comprises a second substep for the application of glue to the upper flaps (1) once said box has been closed, which guarantees stability of the boxes when they are stacked, and, optionally a step for detecting the open position of an upper flap (1) or a support flange (2) once the box has been closed during the closing step, which prevents performing said substep for the application of glue to the upper flaps (1) or the closing flanges (2) prior to the second substep for the application of glue to the upper flaps (1).

Claims

1. Multiformat box closing machine for the closing of boxes that comprise at least one flap (1), or one upper side, and at least one support flange (2), starting from open boxes loaded with products, wherein the machine comprises box loading means (10, 11, 12, 13, 14, 15, 16), box glueing means (50, 51, 52, 53) and box closing means (100, 101, 102, 103, 104, 105), **characterised in that** the glueing means (50, 51, 52, 53) comprise at least one first glue gun (50) configured to apply glue to the support flange(s) (2) with the flap(s) (1), or the upper side, and the support flange(s) (2) in an open position.

2. Multiformat box closing machine according to claim 1, **characterised in that** the first glue gun(s) (50) is(are) configured to apply glue to the support flange(s) (2) with the flap(s) (1), or the upper side, and the support flange(s) (2) in a vertical position.

3. Multiformat box closing machine according to any of the preceding claims, **characterised in that** the first glue gun(s) (50) comprise(s) guiding means (51) designed to place the flap(s) (1), or the upper side, and the support flange(s) (2) in the open position.

4. Multiformat box closing machine according to any of the preceding claims, **characterised in that** the first glue gun(s) (50) comprise(s) product relocating means (52).

5. Multiformat box closing machine according to claim 4, **characterised in that** the loading means (10, 11, 12, 13, 14, 15, 16) comprise at least a set of means for positioning the boxes (11, 12, 13, 14, 15, 16) in a forward direction of movement towards the closing means (100, 101, 102, 103, 104, 105).

6. Multiformat box closing machine according to claim 5, **characterised in that** the positioning means (11, 12, 13, 14, 15, 16) comprise box gripping means (11) which are intended to be displaced to the box, through one side thereof, by means of a first actuator (12), and a fitting blade (13) facing the gripping means (11), which are intended to be displaced to the box, through a second side thereof opposite to the first side, by means of a second actuator (14).

7. Multiformat box closing machine according to claim 6, **characterised in that** the positioning means (11, 12, 13, 14, 15, 16) further comprise a displacement motor (15) that displaces the gripping means (11) and the first actuator (12) towards the closing means (100, 101, 102, 103, 104, 105), going through the glueing means (50, 51, 52, 53).

8. Multiformat box closing machine according to any of claims 5 to 7, **characterised in that** the positioning means (11, 12, 13, 14, 15, 16) further comprise detection means (16) designed to determine that the box to be gripped is facing the gripping means (11).

9. Multiformat box closing machine according to any of claims 5 to 8, **characterised in that** the loading means (10, 11, 12, 13, 14, 15, 16) further comprise a forward-movement roller conveyor (10) that collaborates with the positioning means (11, 12, 13, 14, 15, 16), in order for the boxes to slide towards the closing means (100, 101, 102, 103, 104, 105), going through the glueing means (50).

10. Multiformat box closing machine according to any of claims 5 to 9, further comprising transverse positioning means configured to facilitate the positioning.

11. Multiformat box closing machine according to any of claims 9 or 10, **characterised in that** the transverse positioning means comprise a retractable stop bar

(17) placed between the rollers of the roller conveyor (10), designed to mark a reference position that defines the position and the forward movement of the box.

12. Multiformat box closing machine according to any of the preceding claims, **characterised in that** the closing means (100, 101, 102, 103, 104, 105) comprise at least one upper blade (100) configured to perform the closing of the flap(s) (1), or the upper side, and at least one lateral blade (101) configured to perform the closing of the support flange(s) (2).

13. Multiformat box closing machine according to claim 12, **characterised in that** the closing means (100, 101, 102, 103, 104, 105) comprise a first set of actuating means (102), designed to displace the upper blade(s) (100) from a first rest position to a second position for the closing of the flap(s) (1), or the upper side, and a second set of actuating means (103, 104), designed to displace the lateral blade(s) (101) from a first rest position to a second position for the closing of the support flange(s) (2).

14. Multiformat box closing machine according to any of the preceding claims, **characterised in that** the glueing means (50, 51, 52, 53) comprise at least one second glue gun (53) configured to apply glue to the flap(s) (1), or the upper side of the box, once said box has been closed.

15. Multiformat box closing machine according to claim 14, **characterised in that** the second glue gun(s) (53) comprise(s) means for detecting (54) the open position of the flap(s) (1), or the upper side, and the support flange(s) (2) once the box has been closed by the closing means (100, 101, 102, 103, 104, 105).

16. Multiformat closing method for boxes that comprise at least one flap (1), or one upper side, and at least one support flange (2), wherein the method performs the closing starting from open boxes loaded with products, which comprises the following steps:

- a box loading step;
- a box glueing step, and
- a box closing step,

characterised in that the glueing step comprises at least one first substep for the application of glue to the support flange(s) (2) with the flap(s) (1), or the upper side, and the support flange(s) (2) in an open position.

17. Multiformat box closing method according to claim 16, **characterised in that** the first substep(s) for the application of glue to the support flange(s) (2) with the flap(s) (1), or the upper side, and the support flange(s) (2) in the open position comprise(s) a guiding substep designed to place the flap(s) (1), or the upper side, and the support flange(s) (2) in the open position.

18. Multiformat box closing method according to any of claims 16 or 17, **characterised in that** the first substep(s) for the application of glue to the support flange(s) (2) with the flap(s) (1), or the upper side, and the support flange(s) (2) in the open position comprise(s) a product placement substep, in case that the height of said products exceeds that of the box.

19. Multiformat box closing method according to any of claims 16 to 18, **characterised in that** the glueing step comprises at least one second substep for the application of glue to the flap(s) (1), or the upper side of the box, once said box has been closed.

20. Multiformat box closing method according to claim 19, **characterised in that**, prior to the second substep(s) for the application of glue to the flap(s) (1), or the upper side of the box, once said box has been closed, the method comprises a step for detecting the open position of the flap(s) (1), or the upper side, and/or at least one support flange (2).

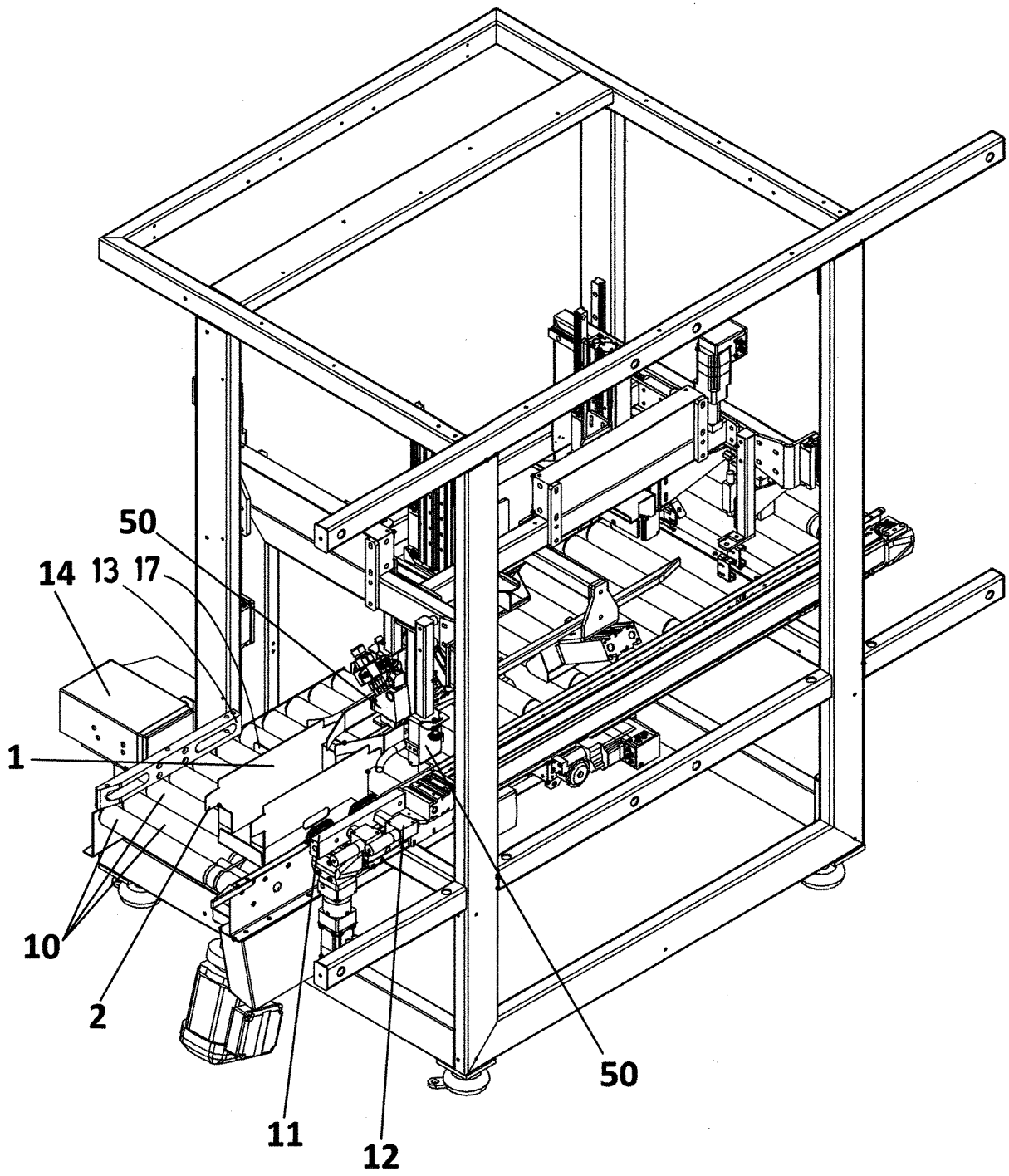

FIG. 1

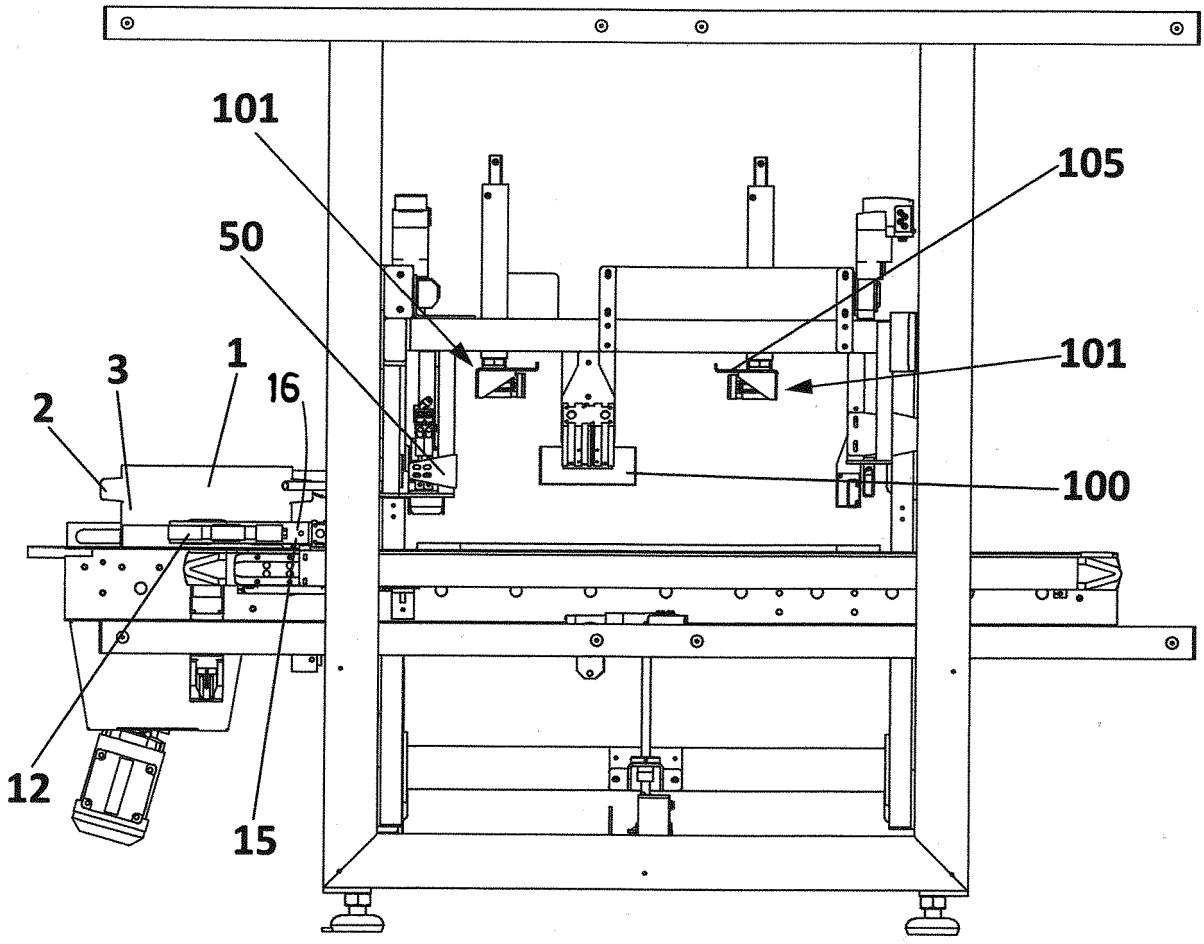

FIG. 2

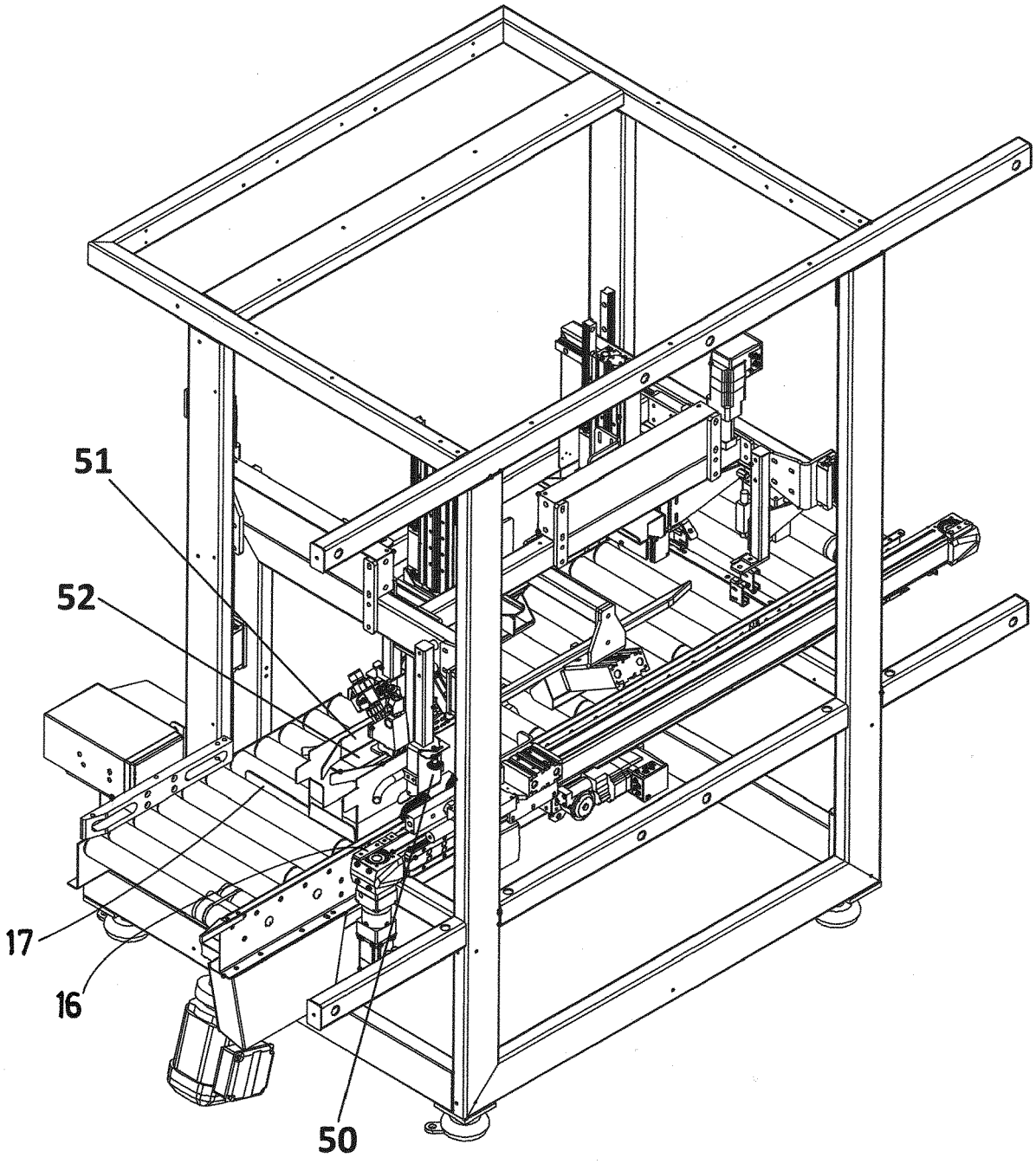

FIG. 3

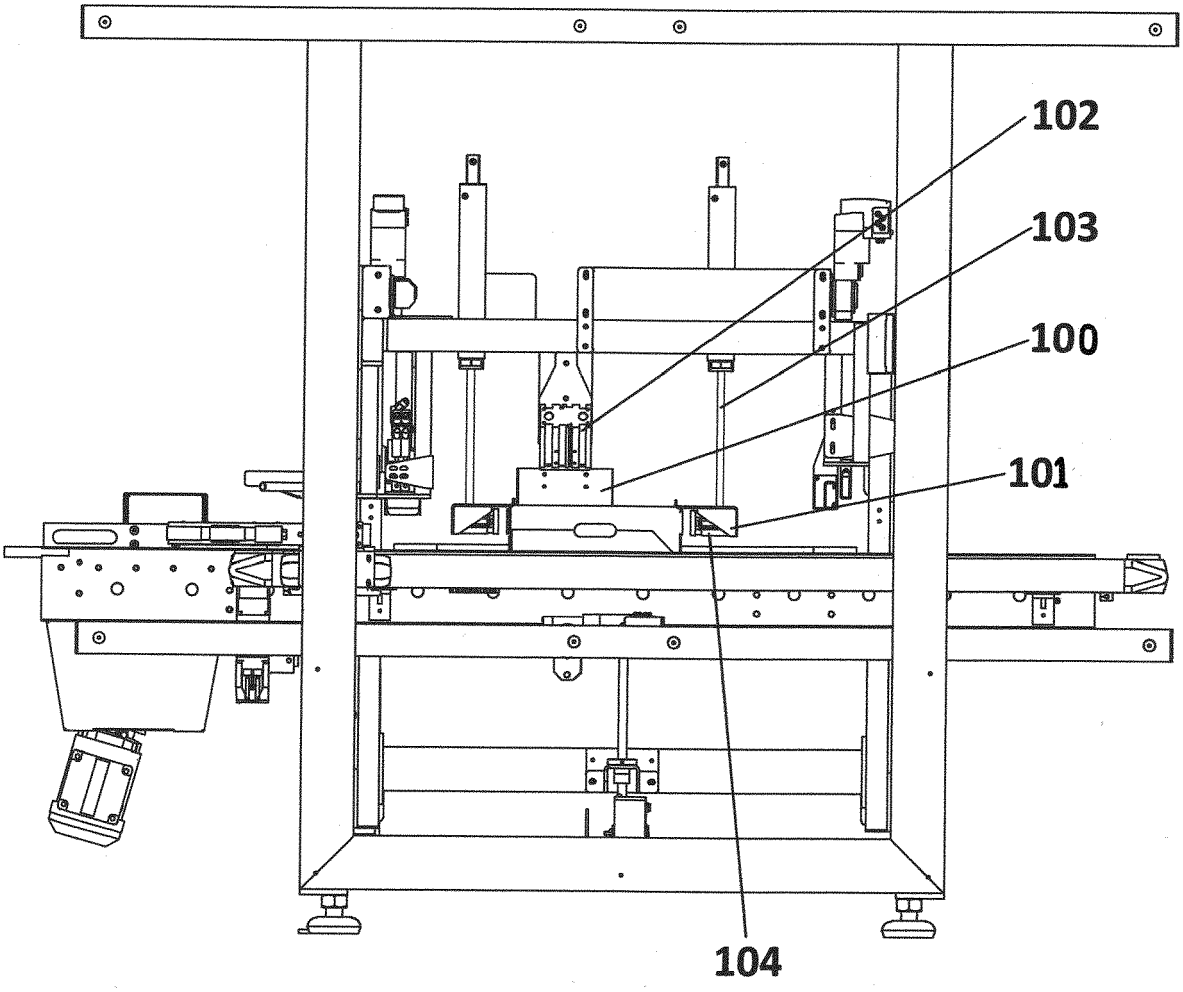

FIG. 4

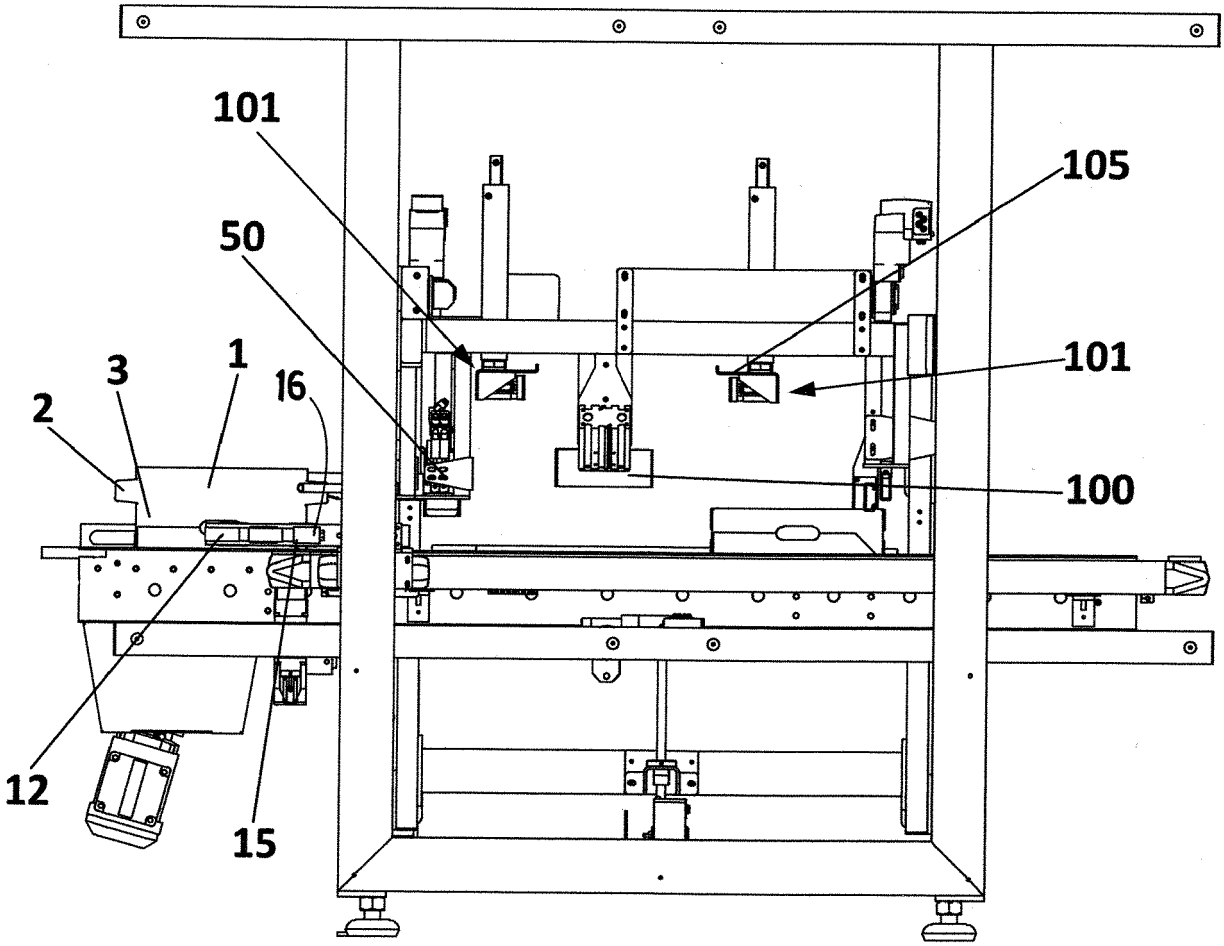

FIG. 5

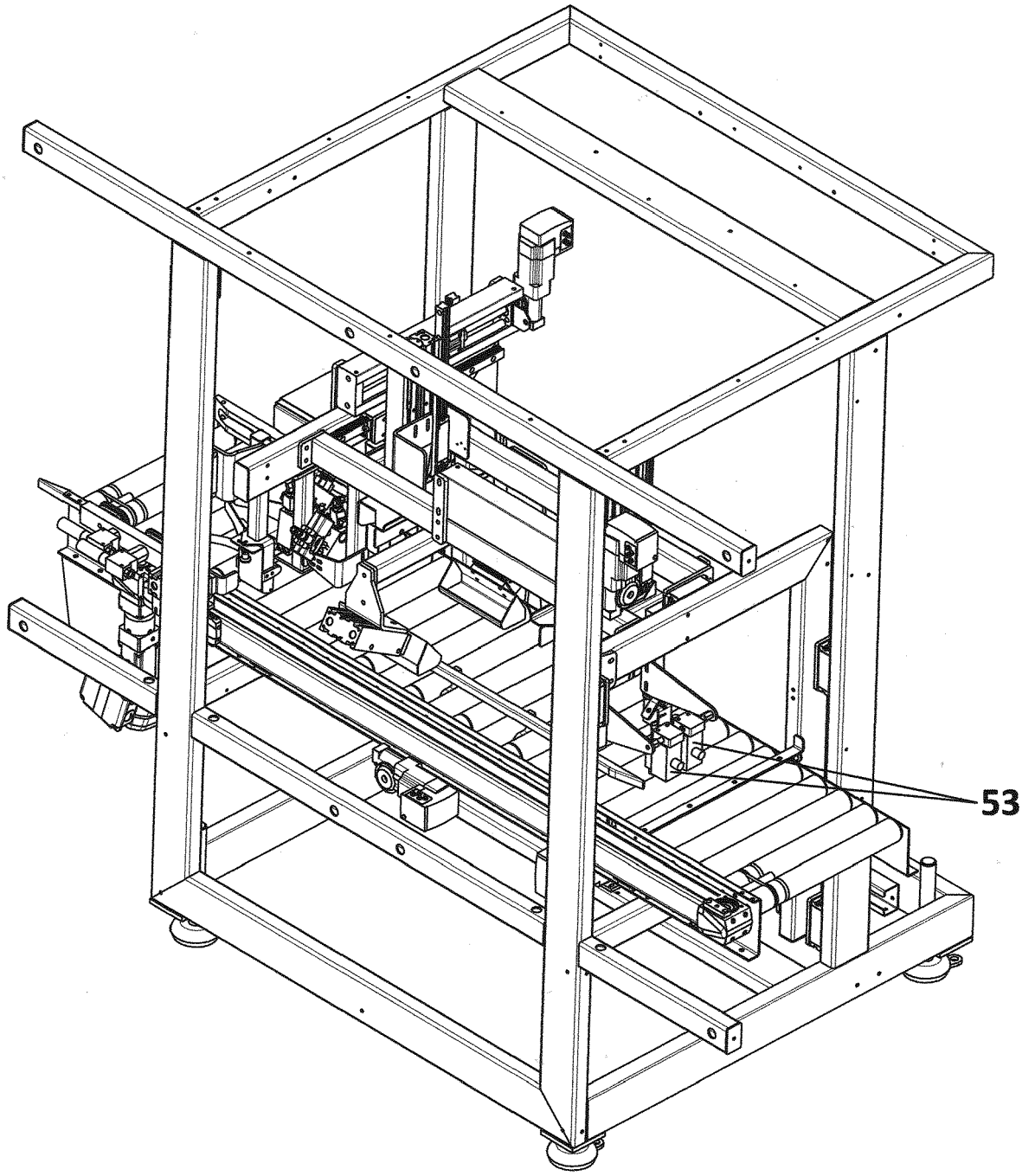

FIG. 6

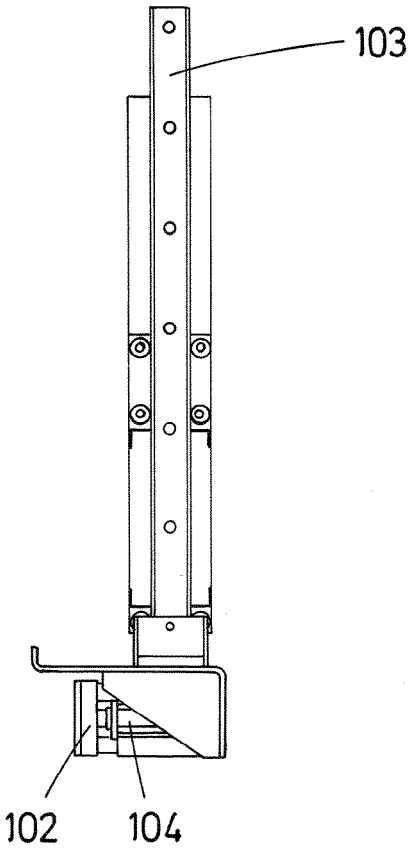

FIG.7A

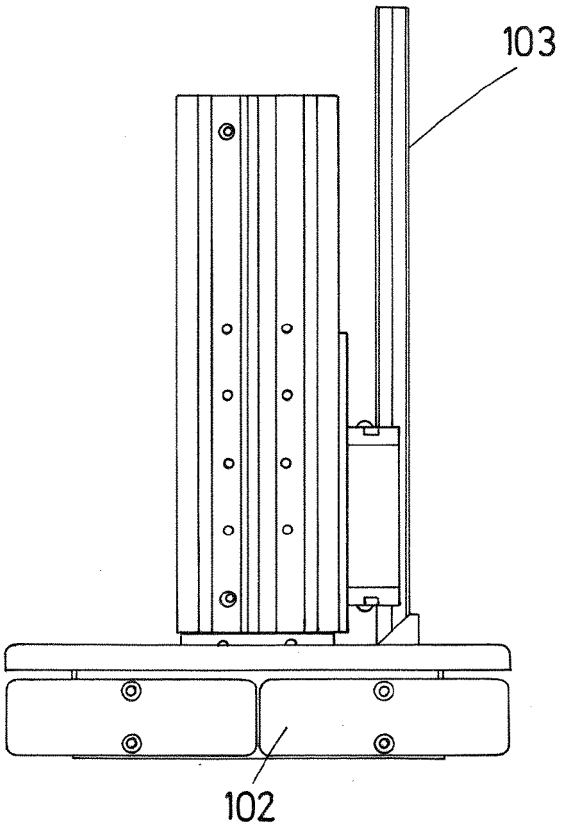

FIG.7B

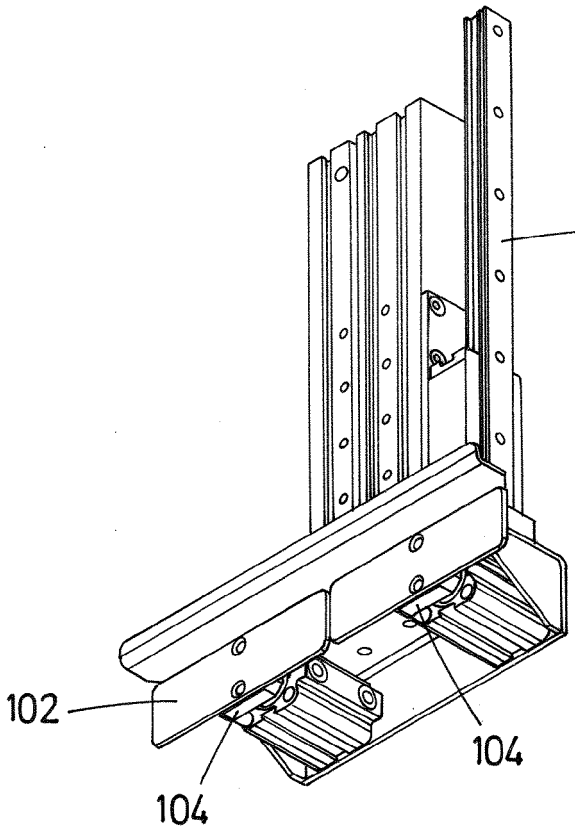

FIG.7C

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EUROPEAN SEARCH REPORT

Application Number
EP 16 38 2522

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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	Date of completion of the search	Examiner
Munich	9 May 2017	Lawder, M

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