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(54) **Empty bag supply method and empty bag supply device**

Verfahren zur Bereitstellung leerer Säcke und Vorrichtung zur Bereitstellung leerer Säcke

Procédé de fourniture de sac vide et dispositif de fourniture de sac vide

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to an empty bag supply method and an empty bag supply device for successively supplying empty bags loaded and housed in a substantially horizontal state inside a bag supply magazine to a processing device such as a bag packaging apparatus, a device for manufacturing bags equipped spouts (spout attaching apparatus) and the like.

2. Description of the Related Art

[0002] As disclosed in Japanese Utility Model Registration No. 2588135, Japanese Patent No. 3084539, and Japanese Patent Application Laid-Open (Kokai) Nos. 2006-36325 and 2006-224546, a technology in which a top-position empty bag of the empty bags loaded and housed in a bag supply magazine (including the empty bags which are in such a cascade like fashion that upper bags are positioned forward than the lower bags in a bag supply direction as seen in a conveyor magazine-type bag supply device) is supplied one at a time in sequence to a bag packaging apparatus or a device for manufacturing bags equipped with spouts is widely known.

[0003] In such a bag supply system, when bags in an empty bag group loaded and housed in the bag supply magazine are in an adhered state due to, for instance, static electricity, and if the top (the upper-most) empty bag is held by suction with a suction disk and picked up upward, such a problem sometimes occurs that an empty bag(s) (one or a plurality) underneath the suction-held bag is also picked up along with it (called a "multiple-bag pickup"), and the two (or more) bags are supplied together to a bag packaging apparatus or to a device for manufacturing bags with spouts (called a "multiple-bag supply").

[0004] To prevent this multiple-bag supply, in the Japanese Utility Model Registration No. 2588135, resistance members that come in contact with the empty bag raised by a suction disk are installed in the upper portions of both side walls of the bag supply magazine, so that the second (and subsequent empty) bag(s) raised together with the top or the upper most empty bag is (are) brought to contact the resistance members so as to be separated from the top and suction-held empty bag. On the other hand, in the Japanese Patent No. 3084539, the center portion of the top or the upper-most empty bag is pressed lightly by a positioning bar, and then the forward end of the top empty bag is suction-held by a suction disk, and then the suction disk then turned slightly so that the forward end of the suction-held empty bag is flipped slightly; and after the air is blown into between the top empty bag and the second empty bag to separate them, the suction disk is moved upward.

[0005] In any of the countermeasures described above, the bag(s) beneath the top empty bag is (are) separated from the top empty bag using a suction disk. However, due to the recent demands of higher-speed bag supply process and shorter-time taking out of the bags, an efficient bag separation cannot be expected from the relevant art described above.

[0006] Meanwhile, when a suction disk is used as a transporting means for transporting the empty bags from the suction disk that takes out the empty bag from the bag supply magazine and transfer it to a specified empty bag receiving position (as seen in Japanese Patent Application Laid-Open (Kokai) No. 2006-36325), during the transportation by the suction disk, air could flown into between the suction-held empty bag (which is the top empty bag) and the underneath empty bag adhered to the suction-held empty bag (second and subsequent empty bags), so that the underneath empty bag(s) drops and is thus separated from the top empty bag. In this case, however, where the concerned empty bag(s) will drop is unknown; and depending on the location the bag (s) drops, there is a possibility that trouble will occur when taking out the next empty bag.

BRIEF SUMMARY OF THE INVENTION

[0007] The present invention is made in view of these kinds problems seen in the conventional art.

[0008] It is, therefore, a general object of the present invention to provide an empty bag supply method and an empty bag supply device in which a multiple-bag supply is prevented when the top empty bag is picked-up from the empty bag group loaded and housed in a substantially horizontal state in a bag supply magazine and is supplied to a bag packaging apparatus or to a device for manufacturing bags equipped with spouts.

[0009] Another object of the present invention is to provide an empty bag supply method and an empty bag supply device in which when multiple-bag supply occurs, a second bag (and subsequent empty bags) can be dropped (separated) without causing any interference with a supply of the next bag.

[0010] The above objects are accomplished by unique steps of an empty bag supply method of present invention, and the method comprises the unique steps of:

suction-holding, with a first suction-hold member, the top surface near the front end of the bag-supply direction of an empty bag which is at the top position inside a bag supply magazine,

moving the first suction-hold member upward to lift up the empty bag,

gripping a portion near the front end of the lifted-up empty bag by a grip member and then releasing suction-holding of the bag by the first suction-hold member,

moving the grip member to transport the empty bag to a first specified position and changing the empty

bag to a substantially vertical attitude,
suction-holding by a second suction-hold member a front-side surface in the bag-supply direction of the empty bag which is in the substantially vertical attitude, and
moving the second suction-hold member to transport the empty bag to a second specified position so as to hand over the bag to an adjacent processing device.

[0011] In the above-described empty bag supply method of the present invention, the second suction-hold member is moved to transport the empty bag to the second specified position while changing the empty bag into a substantially horizontal attitude, and then the empty bag is handed over to the processing device.

[0012] In this structure, it is preferable that a plurality of the second suction-hold members be provided for each empty bag, and the plurality of second suction-hold members suction-hold at least two vertical points on the front-side surface in the bag-supply direction of the empty bag.

[0013] In a typically example, the empty bag is placed with the bag mouth side or the bag bottom side facing the bag-supply direction inside the bag supply magazine; and upon changing the empty bag to the substantially horizontal attitude, the lower side of the empty bag which is in a substantially vertical attitude is caused to face the forward side in the bag-supply direction, thus reversing the orientation of the bag mouth side and bag bottom side of the empty bag from the orientation thereof when the empty bag was inside the bag supply magazine.

[0014] The above objects are accomplished also by a unique structure of the present invention for an empty bag supply device that includes

a first suction-hold member that moves back and forth between a first receiving position and a first hand-over position, which is above the first receiving position, the first suction-hold member suction-holding at the first receiving position a top surface near the front end in a bag-supply direction of the empty bag which is at a top position inside a bag supply magazine, and then lifting up the suction-held empty bag when the first suction-hold member comes to the first hand-over position;
a first suction-hold member moving mechanism for moving the first suction-hold member back and forth between the first receiving position and the first hand-over position;
a grip member that moves back and forth between a second receiving position and a second hand-over position, wherein the grip surface of the grip member, while the grip member is being moved from the second receiving position to the second hand-over position, is changed from a substantially horizontal state to a substantially vertical state, and the grip member at the second receiving position grips near the front end of the empty bag suction-held by the first suction-hold member, which is at the first hand-over position, and suspends the gripped empty bag in a substantially vertical attitude when the grip member comes to the second hand-over position;
a grip member moving mechanism for moving the grip member back and forth between the second receiving position and the second hand-over position;
a second suction-hold member that moves back and forth between a third receiving position and a third hand-over position, wherein the second suction-hold member at the third receiving position suction-holds a front-side surface in the bag-supply direction of the empty bag gripped by the grip member when the second suction-hold member comes to the second hand-over position and then hands over the empty bag to an adjacent processing device when the second suction-hold member comes to the third hand-over position; and
a second suction-hold member moving mechanism for moving the second suction-hold member back and forth between the third receiving position and the third hand-over position.

[0015] In this empty bag supply device, the second suction-hold member moving mechanism changes the suction surface of the second suction-hold member from a substantially vertical state to a substantially horizontal state while the second suction-hold member is being moved from the third receiving position to the third hand-over position. By this changes in the second suction-hold member, the empty bag suction-held by the second suction-hold member is changed from a substantially vertical state to a substantially horizontal state.

[0016] In this structure, it is preferable that a plurality of the second suction-hold members be provided for each empty bag, and the plurality of second suction-hold members in a vertical orientation suction-hold at least two vertical points on the front-side surface in the bag-supply direction of the empty bag.

[0017] In a typical example, the second suction-hold member moving mechanism changes the suction surface of the second suction-hold member from the substantially vertical state to the substantially horizontal state and so as to face downward while the second suction-hold member is being moved from the third receiving position to the third hand-over position.

[0018] The above-described empty bag supply device of the present invention can be further provided with a suction-aid member which is installed below the second hand-over position of the grip member and is moved back and forth between an evacuation position, which avoids interference between the grip member and the empty bag gripped by the grip member, and a suction-aid position, which faces the suction surface of the second suction-hold member that is at the third receiving position. In addition, a suction-aid member moving mechanism for moving the suction-aid member back and forth between the evacuation position and the suction-aid position can

be also provided.

[0019] In the structure above, at the suction-aid position the suction-aid member faces the suction surface of the second suction-hold member that is at the third receiving position and supports the rear-side surface in the bag-supply direction of the empty bag gripped by the grip member which is at the second hand-over position.

[0020] In the above-descried empty bag supply device of the present invention, the grip member is comprised of grip sections, and the grip section, which is positioned on a back side in the bag-supply direction of the empty bag when the grip member is at the second hand-over position, is provided with an extended portion that faces the suction surface of the second suction-hold member which is at the third receiving position, so that the extended portion supports the rear-side surface in the bag-supply direction of the empty bag at the second hand-over position.

[0021] As seen from the above, according to the present invention, if a multiple-bag pickup has occurred when the top or the first empty bag is picked-up by the first suction-hold member from the bag supply magazine, those empty bags (including the top or first empty bag and the second or subsequent bag(s)) are gripped by the grip member, and in the process of being transported and converted from a substantially horizontal attitude to a substantially vertical attitude, the air flows into between the empty bags and adhesion of the bags is eliminated; and when the bag surface of the top or first empty bag is then suction-held by the second suction-hold member and the gripped empty bag(s) is released from the grip member, the second or subsequent empty bag(s) (or unwanted empty bag(s) in the bags of the multiple-bag pick-up) other than the empty bag actually suction-held by the second suction-hold member is (are) dropped. Thus, a multiple-bag supply can be prevented.

[0022] Also, since the empty bags (including the top or first empty bag and the second or subsequent bag(s)) that have been suction-held and lifted up from the bag supply magazine by the first suction-hold member are gripped by the grip member and transported, the empty bags are avoided from dropping during this transportation; and when the bag surface of the top or first empty bag is suction-held by the second suction-hold member and the empty bags are released from the grip by the grip member, then bags except for the suction-held top or first bag are dropped immediately. Accordingly, it is possible to have a stable one bag supply (or a two bag supply in a W-type device) without having trouble taking out the empty bags from the bag supply magazine and transporting, and the unwanted (or the second or subsequent) empty bag(s) is always dropped at a consistent location.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0023]

FIG. 1 is top view of an example of a system in which the empty bag supply device according to the present invention is employed;

FIG. 2 is side view of the empty bag supply device according to the present invention;

FIG. 3 is top view thereof;

FIG. 4 is cross sectional view taken along the line IV-IV in FIG. 2(showing only the drive mechanism part;

FIG. 5 shows the relationship between the suction points by the suction-hold members and the shape of the grip section of the grip members.

DETAILED DESCRIPTION OF THE INVENTION

[0024] The present invention will be described below in detail with reference to FIG. 1 through FIG. 4.

[0025] First, FIG. 1 shows an example of the empty bag supply device according to the present invention used in a rotary-type bag manufacturing device 1 for manufacturing bags that are equipped spouts.

[0026] The spout-equipped bag manufacturing device 1 includes a plurality of bag support members 3 (see FIGs. 2 and 3) installed on the periphery of an intermittently rotating table 2; and while the table 2 makes one rotation, the bag manufacturing device 1 receives bags 4, in each of which the bag top edge part 4a is opened and the shoulder part 4b is cut diagonally, and then holds the bags 4 horizontally on the bag support members 3. A spout 5 is inserted in the shoulder part 4b of each one of the bags 4, the spout 5 is adhered to the shoulder part 4b, and thus a bag 6 equipped with a diagonal spout is manufactured (see Japanese Patent Application Laid-Open (Kokai) No. 2006-224546). The bag manufacturing bag device 1 is a W- type device designed to manufacture two bags at once; and thus ten sets of bag support members 3 with each set comprising two bag supporting members 3 are provided at equal angle intervals.

[0027] More specifically, the table 2 stops ten times while it makes one rotation, and at each stop position, each one of the bag manufacturing steps for manufacturing the bag 6 equipped with a diagonal spout is performed in sequence. In other words, at stop position I a conveyor magazine-type bag supply device 7 (only the tip part of the bag supply magazine 7a is shown) is provided, and two bags 4 are simultaneously supplied onto the bag supply members 3 via the empty bag supply device 8 of the present invention (the conveyor magazine-type bag supply device 7 and the empty bag supply device 8 are also W-type devices). In the conveyor magazine type bag supply device 7, an empty bag group is loaded with the bag mouth of each one of the bags facing the forward direction in the bag supply magazine 7a and skewed in the longitudinal direction so that the top bag is positioned forward than the other bags underneath; and two bag groups side by side are sent forward in a substantially horizontal attitude, so that the tip end of the bag of each group at the top position abuts a stopper 9

(see FIG. 2) that is provided positioning of the bags. The bags 4 positioned inside the bag supply magazine 7a are, as will be described below, supplied to the bag support members 3 by the empty bag supply device 8 with the bag mouth side and the bag bottom side directions reversed (from those of the bags which were inside the bag supply magazine) and in a substantially horizontal attitude.

[0028] As shown in FIGs. 2 and 3, corresponding to each one of the bag support members 3, a bag holding member (comprising a movable member 11 and a stationary receiving member 12) is provided vertically with a bag support surface 3a in between. The movable member 11 of the bag holding member is installed so that it swings vertically on the table 2, and the receiving member 12 of the bag holding member is installed on the bag support member 3. The movable member 11 and the receiving member 12 respectively have gripping portions 11a and 12a at the tip ends in the radial direction. When a bag 4 is placed on the bag support surface 3a, an air cylinder 14 operates so that the movable member 11 swings downward, and thus the gripping portion 11a thereof is moved down, and an area near the top edge part 4a of the bag 4 is gripped by the gripping portion 11a of the movable member 11 and the gripping portion 12a of the receiving member 12. Each one of the bag support members 3 is supported so as to swing on the table 2 within the vertical plane parallel to the radial direction of the table 2, and the bag support member 3 is tilted by the air cylinder 15.

[0029] At stop position II, a bag positioning device 16 is provided, and positioning of the bags 4 on the bag support member 3 is made by this bag positioning device 16. When the positioning of the bags is performed, the movable member 11 of the bag holding member is raised by the air cylinder 14 and temporarily releases the bag 4, the positioning of the bag 4 is done, the movable member 11 is then lowered and again grips the bag 4, and the bag 4 is held substantially in horizontal at a predetermined position on the bag support member 3.

[0030] At stop position III, spout supply devices 17 and 18 are provided, and a device (not illustrated) for opening the bag mouth is also provided. Opening of the shoulder part 4b of each bag 4 and supply of the spout 5 (insertion of the spout into the shoulder part 4b) to each bag 4 are performed at this stop position III. A spout grip member 19 (see FIG. 3) that can open and close vertically are provided on the table 2 so as to correspond to each bag support member 3, and the spout 5 inserted in the shoulder part 4b of the bag 4 is gripped by this spout grip member 19 and held at a predetermined position.

[0031] Sealing devices (only their heating plates 21, 22, and 23 are shown) are provided at stop positions IV to VI, and a cooling device (only its cooling plate 24 is shown) is provided at stop position VII; and thus adhesion sealing and cooling of the spout 5 and the shoulder part 4b of the bag 4 are performed at these stop positions IV to VIII.

[0032] A testing device 25 that tests the attachment position of the spout 5 is provided at stop position VIII; and when test signals are received and the attachment of the spout 5 to the bag 4 is determined to be defective, the air cylinder 15 operates during the rotation of the table 2, the bag support member 3 is thus tilted outward and downward, and the defective bag(s) is ejected.

[0033] At stop position IX, bags 6 equipped with diagonal spouts are taken out by a bag transfer device (not illustrated) and transported to a bag packaging device (not illustrated).

[0034] The empty bag supply device 8 provided between the table 2 and the conveyor magazine-type bag supply device 7 includes an empty bag take-out means that takes out the bags 4 from the bag supply magazine 7a; a first empty bag transport means that receives the bags 4 from the empty bag take-out means, transports them in a circular trajectory, and moves them into a substantially vertical attitude; and a second empty bag transport means that receives the bags 4 from the first empty bag transport means, moves the bags into a horizontal attitude, and transports the bags to and places them in the bag support members 3 of the bag manufacturing device 1.

[0035] The empty bag take-out means of the empty bag supply device 8 is comprised of first suction-hold members 26 that are moved back and forth between the lower first receiving position and the first hand-over position which is set above the first receiving position. The empty bag take-out means is further comprised of a first suction-hold member moving mechanism 27 that makes the back-and-forth movement of the first suction-hold members 26 between the first receiving position and the first hand-over position. In FIG. 2, the first suction-hold member 26 at the first receiving position is shown by the solid lines, and it is shown by the imaginary lines (dotted lines) when it is at the first hand-over position; and the movement path of the first suction-hold member 26 is shown by the two-headed arrow A1. As seen from FIG. 2, the first suction-hold member moving mechanism 27 comprises, among others, a lever 28 that supports the first suction-hold member 26 and a shaft 29 on which the lever 28 is mounted. The first suction-hold member 26 is connected to a switching valve and a vacuum source (not illustrated) by a vacuum pipe.

[0036] At the first receiving position, the suction surface of each of the first suction-hold members 26 faces substantially horizontally downward and suction-holds the top surface near the front end in the bag-supply direction of the top or first empty bag 4 that is inside the bag supply magazine 7a and positioned abutting the stopper 9. While swinging rearward (rearward in the bag-supply direction of the empty bag 4 or to the right side in FIG. 2), the first suction-hold member 26 is raised and moved to the first hand-over position, so that the suction-held empty bag 4 is raised and the front end part of the bag is lifted. There are two of the first suction-hold members 26 (a left/right pair) provided for each empty bag

(see the suctioned points A of each one of the bags 4 in FIG. 5).

[0037] The first empty bag transport means of the empty bag supply device 8 is comprised of a grip member 31 that moves back and forth between a second receiving position and a second hand-over position that is above the second receiving position and where the grip member 31 is raised along a circular path so as to be at an upward front side of the second receiving position (or the front side in the bag-supply direction of the empty bag 4). The first empty bag transport means is further comprised of a grip member moving mechanism 32 that makes back-and-forth movement of the grip member 31 between the second receiving position and the second hand-over position. In FIG. 2, the grip member 31 at the second receiving position is shown by the imaginary lines (dotted lines), and the grip member 31 at the second hand-over position is shown by the solid lines, and the movement path of the substantially circular shape is depicted by the two-headed arrow A2.

[0038] As shown in FIG. 3, the grip member 31 has two grip sections 33 and 34 which have a width (horizontal direction width) that is enough for the grip sections 33 and 34 to grip two bags 4 simultaneously as shown in FIG. 3; and of these two grip sections 33 and 34, the grip section 34, as shown in FIG. 5, is positioned on the back side of the bag 4 (or the rearward in the bag-supply direction of the empty bag 4) when it comes to the second hand-over position, and this grip section 34 has extended portions 34a extending in a tongue shape and are positioned so as to correspond to the middle portion of each one of the bags 4 in the bag's width direction. The grip section 34 is fixed to the swing lever 35 described later, and the grip section 33 is axially supported on the swing lever 35 so as to be swingable within the vertical plane along the bag-supply direction of the bag 4; and thus by the operation of the air cylinder 36 provided on the swing lever 35, the grip section 34 and the grip section 33 are opened and closed.

[0039] The grip member moving mechanism for the grip member 31 is comprised of the swing lever 35 and a fulcrum shaft 37 axially supported in a box frame 30 in a rotatable fashion. The grip member moving mechanism is further comprised of a swing arm 38 fixed at its one end to the fulcrum shaft 37 and rotatably connected at its other end to a shaft member 40 that is fixed to the intermediate position of the swing lever 35, a link 41 that links the rear end of the swing lever 35 and a link support member 39 installed on the box frame 30, and a vertically swingable ascending-descending lever 43 of which one end is fixed to the fulcrum shaft 37 and the other end is linked to a drive source (not illustrated) via a linking member 42 (see FIG. 4). When the ascending-descending lever 43 swings vertically, the swing arm 38 swings within the vertical plane along the bag-supply direction of the bag 4, and the swing lever 35 also swings along a substantially circular-shaped path, and the grip member 31 is thus moved back and forth along the moving path between the second receiving position and the second hand-over position.

[0040] When the ascending-descending lever 43 swings vertically, the grip member 31 is moved up and moved down. More specifically, when the ascending-descending lever 43 swings down, the grip sections 33 and 34 of the grip member 31, which are opened, are moved to the second receiving position; and at the second receiving position, they are closed so as to grip the front end part of the bag 4, which is lifted by the first suction-hold member 26 that has come to the first hand-over position, across the full width of the bag 4. Subsequently, the first suction-hold member 26 is vented and the bag 4 is thus released from the first suction-hold member 26. When the ascending-descending lever 43 swings upward, the grip sections 33 and 34 are moved up toward the second hand-over position, and during this upward movement, the gripped surface of the bag 4 is changed from a substantially horizontal state to a substantially vertical state; and when the grip sections 33 and 34 came to the second hand-over position, the bag 4 gripped by the grip sections 33 and 34 is suspended in a substantially vertical attitude.

[0041] As seen from FIG. 5, the suction points A of the first suction-hold member 26 are set at both sides of the extended portion 34a of the grip section 34 of the grip member 31. Accordingly, there is no mutual interference between the grip member 31 that has come to the second receiving position and the first suction-hold member 26.

[0042] The second empty bag transport means of the empty bag supply device 8 is comprised of two second suction-hold members 44 and 45 that are moved back and forth between the upper third receiving position and the lower third hand-over position which is at the front side below the upper third receiving position (the front side in the bag-supply direction of the empty bag 4), and the second empty bag transport means further includes a second suction-hold member moving mechanism 46 that makes the back-and-forth movement of the second suction-hold members 44 and 45 between the upper third receiving position and the lower third hand-over position. In FIG. 2, the second suction-hold members 44 and 45 at the third receiving position are shown by the solid lines and by imaginary lines (dotted lines) when it is at the third hand-over position. Since the bag supply device 8 is a W-type device, the second suction-hold members 44 and 45 are provided as one set for each bag 4 and for a total of two sets.

[0043] The second suction-hold members 44 and 45 of the second empty bag transport means are linked by a conduit tube 47 of a specified length; and a conduit tube 48 of the second suction-hold member 44 is fixed to an attachment stay 49 described later and, furthermore, is connected to a switching valve and a vacuum source (not illustrated) by a vacuum pipe 51. At the third receiving position, the second suction-hold member 44 is, as seen from FIG. 2, positioned at an upper side, and the second suction-hold member 45 is at a lower side or

below the suction-hold member 44; and at the third hand-over position, they are substantially at the same height level.

[0044] The second suction-hold member moving mechanism 46 of the second empty bag transport means is comprised of a fulcrum shaft 52, of which one end is axially supported so as to be able to rotate horizontally on the box frame 30, and a swing arm 53, of which one end is fixed to the fulcrum shaft 52. The attachment stay 49 of the second suction-hold member moving mechanism 46 is rotatably provided at its base part 49a on the shaft member 53a, which is at the other end of the swing arm 53, and it extends horizontally. The second suction-hold member moving mechanism 46 further includes a shaft member 54 fixed to the base part 49a of the attachment stay 49, a guide block 55 slidably provided on the shaft member 54, a shaft receiving member 58 and a vertically swingable ascending-descending lever 61. The shaft receiving member 58 is fixed to a support member 56, which is installed on the box frame 30, and rortatably supports the shaft member 57 of the guide block 55, and the vertically swingable ascending-descending lever 61 is fixed at one end thereof to the fulcrum shaft 52 and linked at another end thereof to a drive source (not illustrated) via the linking member 59 (see FIG. 4).

[0045] In the above-described structure, when the ascending-descending lever 61 swings vertically, the swing arm 53 swings within the vertical plane in the bag-supply direction of the bag 4, and the attachment stay 49 also swings vertically (see the two-headed arrow A3 in FIG. 2). Also, when the attachment stay 49 swings downward, as can be seen from the solid lines and imaginary lines (dotted lines) in FIG. 2, the attachment stay 49 rotates substantially 180° in the reverse direction (rightward rotation in FIG. 2) with respect to the bag-supply direction of the bag 4 with the shaft member 53a of the swing arm 53 as the center. Ultimately, the attachment stay 49 makes a rotation of substantially 90° in the opposite direction with respect to the bag-supply direction with a summation of a substantially 90° rotation in the forward direction with respect to the bag-supply direction caused by the swing motion of the swing arm 53 and a substantially 180° rotation in the reverse direction described above with the shaft member 53a of the swing arm 53 at the center.

[0046] The second suction-hold members 44 and 45 of the second empty bag transport means are provided so that, as described above, they are positioned above and below (the suction-hold member 44 being above the other suction-hold member 45) at the third receiving position, and the suction surfaces of the second suction-hold members 44 and 45 face the substantially vertical back side (back side in the bag-supply direction). Thus, the suction surfaces of the second suction-hold members 44 and 45 suction-hold the front-side surface of the bag 4 (forward surface of the bag with respect to the bag-supply direction), which is gripped by the grip member 31 that has come to the second hand-over position and is in a substantially vertical attitude, so that the bag 4 is suction-held at two vertical points in the width direction center part thereof (In other word, as seen from FIG. 5, the suction surface of the upper suction-hold member 44 suction-holds the bag at B 1 which is close to the bag mouth of the bag 4, and the suction surface of the lower suction-hold member 45 suction-holds the bag at B2 which is close to the center bottom of the bag). Subsequently, the grip members 31 of the first empty bag transport means are opened, and after the bags 4 are thus released from the grip members 31, the second suction-hold members 44 and 45 of the second empty bag transport means swing downward toward the third hand-over position when the attachment stay 49 swings to the downward forward side by the swing motion of the swing arm 53; and when the second suction-hold members 44 and 45 rotate about the shaft member 53a of the swing arm 53 and come to the third hand-over position, the suction surfaces of the second suction-hold members 44 and 45 take a substantially horizontal state and face down, and thus the bags 4 are also changed from a substantially vertical attitude to a substantially horizontal attitude.

[0047] At the third hand-over position, the bags 4 are placed on the bag support member 3 of the bag manufacturing device for manufacturing bags equipped spouts (see the imaginary lines (dotted lines) in FIG. 2), the moveable members 11 are moved down, and a portion near the top edge part 4a of each one of the bags 4 is gripped between the moveable members 11 and the receiving members 12, the second suction-hold members 44 and 45 are vented to the atmosphere to release the bags 4, and subsequently, the second suction-hold members 44 and 45 are raised back to the third receiving position.

[0048] During the above-described movements, since two vertical points of each one of the bags 4 are suction-held by the second suction-hold members 44 and 45 as described above, though the suction-hold members 44 and 45 are rotated during the movement, it is possible to securely hold (the attitude of) the bags 4.

[0049] The empty bag supply device 8 is further provided with two suction-aid means that assures reliable suction-holing by the second suction-hold members 44 and 45.

[0050] One suction-aid means is a suction-aid means for the second suction-hold member 44 that is positioned at the upper side at the third receiving position. This suction-aid means is the extended portions 34a formed on the grip section 34 that are on the back side when the grip members 31 come to the second hand-over position. When the second suction-hold member 44 suction-holds the front-side surface of the bag 4 which is in a substantially vertical attitude by being gripped by the grip member 31 at the third receiving position (see suction point B 1 in FIG. 5), the extended portion 34a facing the suction surface of the second suction-hold member 44 supports the rear-side surface of the bag 4. In this way, suction-holding of the bag 4 by the second suction-hold member

44 is assured.

[0051] The other suction-aid means is a suction-aid means for the other second suction-hold member 45 which comes to a lower side at the third receiving position, and it is a suction-aid means 62 provided at a lower position of (or below) the second hand-over position of the grip member 31. The suction-aid means 62 is, as seen from FIG. 2, comprised of a plate-shaped suction-aid member 63 and a suction-aid member moving mechanism 64. The plate-shaped suction-aid member 63 is moved by the suction-aid member moving mechanism 64 back and forth between the evacuation position, at which it takes a substantially horizontal state, and the suction-aid position, at which it takes a substantially vertical state; and the suction-aid member moving mechanism 64 makes the back-and-forth movement of the suction-aid member 63 between the evacuation position and the suction-aid position (see FIG. 4). In FIG. 2, the suction-aid member 63 at the evacuation position is shown by the imaginary lines (dotted line) and shown by the solid lines when it is at the suction-aid position, and the movement (swing) path of the suction-aid member 63 is shown by the two-headed arrow A4. The bag supply device 8 is a W-type device, and thus two of the suction-aid members 63 are provided in parallel.

[0052] As seen from FIG. 4, the suction-aid member moving mechanism 64 is comprised of a fulcrum shaft 65 rotatably provided in the box frame 30 (two suction-aid members 63 are provided) and a vertically swingable ascending-descending lever 67 of which one end is fixed to the fulcrum shaft 65 and the other end is linked to a drive source (not illustrated) via the linking member 66. When the ascending-descending lever 67 swings vertically, the fulcrum shaft 65 rotates, and thus the suction-aid member 63 swings and moves back-and-forth between the evacuation position and the suction-aid position.

[0053] The suction-aid members 63 avoid interference with the bags 4, which are gripped by the grip members 31, and the grip members 31 at the evacuation position; and after the grip members 31 pass through above the suction-aid members 63 and come to the second hand-over position, the suction-aid members 63 are moved to the suction-aid position. Each of the suction-aid members 63 that has come to the suction-aid position faces the suction surface of the second suction-hold member 45 and touches to support the rear-side surface of the bag 4 when the second suction-hold member 45 suction-holds the front-side surface of the bag 4 that is gripped by the grip member 31 and in a substantially vertical attitude (see suction point B2 in FIG. 5). In this way, the suction-holding of the bag 4 by the second suction-hold member 45 is assured.

[0054] In the empty bag supply device 8 described above, if a multiple-bag pickup occurs when the top-position (upper-most) bag 4 is picked up by the first suction-hold member 26 from the bag supply magazine 7a, all the bags (top-position (upper-most) or first bag and subsequent bag(s)) are gripped by the grip member(s) 31 and then transported. Accordingly, no drop of unwanted (subsequent) bag(s) during the transportation occurs; and thus since no bag(s) drops on, for instance, the bag supply magazine 7a, a trouble that would occur when picking up the next bag 4 from the conveyor magazine-type bag supply device 7 can be prevented.

[0055] When multiple-bag pickup does occur, those bags (top-position (upper-most) or first bag and subsequent bag(s)) are gripped by the grip member 31, and in the process of transporting while being converted from a substantially horizontal attitude to a substantially vertical attitude, air flows into between the bags and the adhered state of the bags is thus eliminated. Accordingly, when the front-side surface of the gripped first bag is suction-held by the second suction-hold members 44 and 45 and this gripped bag is released from the gripping by the grip member 31, only the bag actually suction-held by the second suction-hold members 44 and 45 (which is the top-position (upper-most) or first bag) remains suction-held "as is" by the second suction-hold members 44 and 45, and the bag(s) that is not suction-held (unwanted empty bag(s) in the multiple-bag pickup) drops at that location. Therefore, it is possible to prevent a supply of bag(s) in the multiple-bag pickup to a device for manufacturing bags equipped with spouts without releasing the unwanted empty bag(s); and since the bag drop position is consistent, it is also possible to prevent the unwanted bag(s) from dropping on the table 2 or on the bag support member 3 of the device for manufacturing bags equipped spouts.

[0056] The above-described empty bag supply device 8 is only one example of the present invention, and it is possible to provide modifications as described below within the technical scope of the present invention.

(1) In the structure described above, at the third receiving position, the second suction-hold members 44 and 45 suction-hold the bag 4 in a substantially vertical attitude with their suction surfaces facing backward in a substantially vertical attitude; and during the process of being moved to the third hand-over position, the suction surfaces are rotated substantially 90° in the opposite direction to the bag-supply direction, so that at the third hand-over position, the suction surfaces are in a substantially horizontal state facing downward. However, for example, it is possible to fix the attachment stay 49 to the swing arm 53 so that the suction surfaces can make only a forward-facing rotation of substantially 90° by the swing motion of the swing arm 53, and at the third hand-over position, the suction surface is in a substantially horizontal state and faces upward on the bag support member. In this structure, however, reversing in the direction of the bag 4 bag mouth side and the bag bottom side between the bag in the bag supply magazine 7a and the bag transferred onto the bag support member 3 does not occur. It is also

necessary to prevent interference between the bag support member and the second suction-hold member.

(2) In the structure described above, so as to assure the orientation of the bag 4 while it is moved from the third receiving position to the third hand-over position by the second suction-hold members 44 and 45, two vertical points of the bag 4 are suction-held by the two second suction-hold members 44 and 45. However, it is also acceptable to suction-hold only one point or to suction-hold three or more points on the bag.

(3) In the structure described above, the bag 4 is changed from its substantially vertical attitude to its substantially horizontal attitude while the bag 4 is being moved by the second suction-hold members 44 and 45 from the third receiving position to the third hand-over position, and this is done so as to supply the bag 4 in a horizontal attitude to a device for manufacturing bags equipped spouts which is the bag supply destination. However, when, for example, supplying bags to a pair of grippers of a typical rotary-type bag packaging apparatus, bags are supplied in a substantially vertical attitude; and thus, in this situation, the second suction-hold members holding the bag can be simply moved horizontally, for example, from the third receiving position to the third hand-over position with the bag 4 being held in a substantially vertical attitude.

(4) Furthermore, in the above-described structure, the suction-aid holding is made possible by the extended portion 34a of the grip section 34 of the grip member 31 for the second suction-hold member 44 and by the suction-aid member 63 for the other second suction-hold member 45. However, for example when the suction-holding point is only one in the upper portion of a bag, then it is not necessary to provide the suction-aid member 63. Furthermore, it is also possible to omit the extended portion 34a and to provide the suction-aid member 63 only.

Claims

1. An empty bag supply method comprising the steps of:

suction-holding, with a first suction-hold member (26), a top surface near a front end of a bag-supply direction of an empty bag which is at a top position inside a bag supply magazine,

moving the first suction-hold member (26) upward to lift up the empty bag,

gripping a portion near the front end of the lifted-up empty bag by a grip member (31) and then releasing suction-holding of the bag by the first suction-hold member (26),

moving the grip member (31) to transport the empty bag to a first specified position and changing the empty bag to a substantially vertical attitude,

suction-holding by a second suction-hold member (44, 45) a front-side surface in the bag-supply direction of the empty bag which is in the substantially vertical attitude, and

moving the second suction-hold member (44, 45) to transport the empty bag to a second specified position so as to hand over the bag to an adjacent processing device.

2. The empty bag supply method according to claim 1, wherein the second suction-hold member (44, 45) is moved to trans port the empty bag to the second specified position while changing the empty bag into a substantially horizontal attitude, and then the empty bag is handed over to the processing device.

3. The empty bag supply method according to claim 2, wherein a plurality of the second suction-hold members (44, 45) are provided for each empty bag, and the plurality of second suction-hold members suction-hold at least two vertical points on the front-side surface in the bag-supply direction of the empty bag.

4. The empty bag supply method according to claim 3, wherein

the empty bag (4) is placed with one of a bag mouth side and a bag bottom side thereof facing the bag-supply direction inside the bag supply magazine, and upon changing the empty bag to the substantially horizontal attitude, a lower side of the empty bag which is in a substantially vertical attitude is caused to face a forward side in the bag-supply direction, thus reversing an orientation of the bag mouth side and bag bottom side of the empty bag from an orientation thereof when the empty bag was inside the bag supply magazine.

5. The empty bag supply device (8) comprising:

a first suction-hold member (26) that moves back and forth between a first receiving position and a first hand-over position, which is above the first receiving position, the first suction-hold member suction-holding at the first receiving position a top surface near a front end in a bag-supply direction of the empty bag which is at a top position inside a bag supply magazine, and then lifting up the suction-held empty bag when the first suction-hold member comes to the first hand-over position;

a first suction-hold member moving mechanism for moving the first suction-hold member back and forth between the first receiving position and the first hand-over position;

a grip member (31) that moves back and forth

between a second receiving position and a second hand-over position, wherein a grip surface of the grip member, while the grip member is being moved from the second receiving position to the second hand-over position, is changed from a substantially horizontal state to a substantially vertical state, and the grip member at the second receiving position grips near the front end of the empty bag suction-held by the first suction-hold member, which is at the first hand-over position, and suspends the gripped empty bag in a substantially vertical attitude when the grip member comes to the second hand-over position;

a grip member moving mechanism (32) for moving the grip member back and forth between the second receiving position and the second hand-over position;

a second suction-hold member (44, 45) that moves back and forth between a third receiving position and a third hand-over position, wherein the second suction-hold member at the third receiving position suction-holds a front-side surface in the bag-supply direction of the empty bag gripped by the grip member when the second suction-hold member comes to the second hand-over position and then hands over the empty bag to an adjacent processing device when the second suction-hold member comes to the third hand-over position; and

a second suction-hold member moving mechanism (46) form moving the second suction-hold member back and forth between the third receiving position and the third hand-over position.

6. The empty bag supply device (8) according to claim 5, wherein the second suction-hold member moving mechanism changes a suction surface of the second suction-hold member from a substantially vertical state to a substantially horizontal state while the second suction-hold member is being moved from the third receiving position to the third hand-over position.

7. The empty bag supply device (8) according to claim 6, wherein a plurality of the second suction-hold members are provided for each empty bag, and the plurality of second suction-hold members in a vertical orientation suction-hold at least two vertical points on the front-side surface in the bag-supply direction of the empty bag.

8. The empty bag supply device (8) according to claim 7, wherein the second suction-hold member moving mechanism changes the suction surface of the second suction-hold member from a substantially vertical state to a substantially horizontal state and so as to face downward while the second suction-hold member is being moved from the third receiving position to the third hand-over position.

9. The empty bag supply device (8) according to any of claims 5 through 8, further comprising

a suction-aid member (63) which is installed below the second hand-over position of the grip member and is moved back and forth between an evacuation position, which avoids interference between the grip member and the empty bag gripped by the grip member, and a suction-aid position, which faces the suction surface of the second suction-hold member that is at the third receiving position, and

a suction-aid member moving mechanism (64) for moving the suction-aid member back and forth between the evacuation position and the suction-aid position,

wherein at the suction-aid position the suction-aid member faces the suction surface of the second suction-hold member that is at the third receiving position and supports a rear-side surface in the bag-supply direction of the empty bag gripped by the grip member which is at the second hand-over position.

10. The empty bag supply device (8) according to any one of claims 5 through 8, wherein the grip member (31) is comprised of grip sections, and the grip section, which is positioned on a back side in the bag-supply direction of the empty bag when the grip member is at the second hand-over position, is provided with an extended portion that faces the suction surface of the second suction-hold member which is at the third receiving position, and the extended portion supports the rear-side surface in the bag-supply direction of the empty bag at the second hand-over position.

Patentansprüche

1. Verfahren zur Bereitstellung leerer Säcke mit den folgenden Schritten:

Saughalterung einer oberen Fläche eines sich auf einer oberen Position in einem Sackbereitstellungsmagazin befindlichen leeren Sacks nahe des in Sackbereitstellungsrichtung vorderen Endes mittels eines ersten Saughalteglieds (26),

Aufwärtsbewegung des ersten Saughalteglieds (26) zum Anheben des leeren Sacks.

Greifen eines Abschnitts in der Nähe des vorderen Endes des angehobenen leeren Sacks durch ein Greifglied (31) und abschließendes Lösen der Saughalterung des Sacks durch das erste Saughalteglied (26),

Bewegung des Greifglieds (31) zum Fördern des leeren Sacks in eine erste vorgegebene

Stellung und Verlagern des leeren Sacks in eine im Wesentlichen senkrechte Lage,
Saughalterung einer in Bereitstellungsrichtung vorderen Fläche des im Wesentlichen in senkrechter Lage befindlichen leeren Sacks mittels eines zweiten Saughalteglieds (44, 45) und
Bewegung des zweiten Saughalteglieds (44, 45) zum Fördern des leeren Sacks in eine zweite vorgegebene Stellung zur Übergabe des Sacks an die folgende Bearbeitungsvorrichtung.

2. Verfahren zur Bereitstellung leerer Säcke nach Anspruch 1, wobei das zweite Saughalteglied (44, 45) bewegt wird, um dem leeren Sack zu der zweiten vorgegebene Stellung zu fördern, wobei der leere Sack in eine im Wesentlichen waagerechte Lage gebracht wird und der leere Sack dann an die folgende Bearbeitungsvorrichtung übergeben wird.

3. Verfahren zur Bereitstellung leerer Säcke nach Anspruch 2, wobei für jeden einzelnen leeren Sack eine Vielzahl von zweiten Saughaltegliedern (44, 45) vorgesehen ist und die Vielzahl der zweiten Saughalteglieder wenigstens zwei senkrechte Punkte auf der in Sackbereitstellungsrichtung des leeren Sacks vorderen Fläche mittels Saugkraft festhalten.

4. Verfahren zur Bereitstellung leerer Säcke nach Anspruch 3, wobei
der leere Sack (41) so platziert wird, dass eine Sacköffnungsseite oder seine Sackbodenseite der Sackbereitstellungsrichtung im Sackbereitstellungsmagazin gegenüberliegt und
nach Verlagern des leeren Sacks in die im Wesentlichen waagerechte Lage eine Unterseite des in einer im Wesentlichen senkrechten Lage stehenden leeren Sacks einer vorderen Seite in Sackbereitstellungsrichtung zugewandt wird, so dass eine Orientierung der Sacköffnungsseite und der Sackbodenseite des leeren Sacks gegenüber der Orientierung des leeren Sacks im Sackbereitstellungsmagazin umgekehrt wird.

5. Vorrichtung (8) zur Bereitstellung leerer Säcke mit
einem ersten Saughalteglied (26), das sich zwischen einer ersten Annahmestation und einer ersten Übergabestation, die über der ersten Annahmestation liegt, hin und her bewegt, wobei das erste Saughalteglied an der ersten Annahmestation eine obere Fläche in der Nähe eines vorderen Endes in Sackbereitstellungsrichtung des leeren Sacks angesaugt hält, der an einer obersten Stelle im Sackbereitstellungsmagazin liegt, und dann den durch Saughalterung gehaltenen leeren Sack aufhebt wenn das erste Saughalteglied die erste Übergabestation erreicht,
einem ersten Saughalteglied-Bewegungsmechanismus, der das erste Saughalteglied zwischen der ersten Annahmestation und der ersten Übergabestation hin- und herbewegt,
einem zwischen einer zweiten Annahmestation und einer zweiten Übergabestation hin- und hergehenden Greifglied (31), wobei eine Greiffläche des Greifglieds während der Bewegung des Greifglieds von der zweiten Annahmestation zur zweiten Übergabestation aus einer im Wesentlichen waagerechten Lage in eine im Wesentlichen senkrechte Lage versetzt wird, und das Greifglied an der zweiten Annahmestation nahe des vorderen Endes des durch das erste Saughalteglied, das sich an der ersten Übergabestation befindet, den durch Saugkraft gehaltenen leeren Sack greift und den ergriffenen leeren Sack in im Wesentlichen senkrechter Lage aufhängt, wenn das Greifglied die zweite Übergabestation erreicht,
einem Greifglied-Bewegungsmechanismus (32) zur Hin- und Herbewegung zwischen der zweiten Annahmestation und der zweiten Übergabestation,
einem zweiten Saughalteglied (44, 45), das sich zwischen einer dritten Annahmestation und einer dritten Übergabestation hin und her bewegt, wobei das zweite Saughalteglied an der dritten Annahmestation mittels Saugkraft eine vordere Fläche in Sackbereitstellungsrichtung des durch das Greifglied gegriffenen leeren Sacks hält, wenn das zweite Saughalteglied die zweite Übergabestation erreicht, und dann den leeren Sack an eine folgende Bearbeitungsvorrichtung übergibt, wenn das zweite Saughalteglied die dritte Übergabestation erreicht, und
einem Bewegungsmechanismus (46) für das zweite Saughalteglied, der das zweite Saughalteglied zwischen der dritten Annahmestation und der dritten Übergabestation hin und her bewegt.

6. Vorrichtung (8) zur Bereitstellung leerer Säcke nach Anspruch 5, wobei der Bewegungsmechanismus für das zweite Saughalteglied eine Ansaugfläche des zweiten Saughalteglieds aus der im Wesentlichen senkrechten Lage in eine im Wesentlichen waagrechte Lage umstellt, während das zweite Saughalteglied von der dritten Annahmestation zur dritten Übergabestation bewegt wird.

7. Vorrichtung (8) zur Bereitstellung leerer Säcke nach Anspruch 6, wobei für jeden einzelnen leeren Sack eine Vielzahl der zweiten Saughalteglieder vorgesehen ist und die Vielzahl der zweiten Saughalteglieder in senkrechter Lage mittels Saugkraft wenigstens zwei senkrechte Punkte auf der vorderen Fläche des leeren Sacks in Sackbereitstellungsrichtung festhalten.

8. Vorrichtung (8) zur Bereitstellung leerer Säcke nach Anspruch 7, wobei der Bewegungsmechanismus für das zweite Saughalteglied die Saugfläche des zweiten Saughalteglieds von einer im Wesentlichen senkrechten Stellung in eine im Wesentlichen waa-

gerechte Stellung und so nach unten gerichtet ändert, während das zweite Saughalteglied von der dritten Annahmestation zu der dritten Übergabestation bewegt wird.

9. Vorrichtung (8) zur Bereitstellung leerer Säcke nach einem der Ansprüche 5 bis 8 mit
einem Ansaughilfsglied (63), das unterhalb der zweiten Übergabestation
des Greifglieds angeordnet ist und zwischen einer Evakuierungsstelle, die eine Störung zwischen dem Greifglied und dem von dem Greifglied gegriffenen leeren Sack vermeidet, und einer Ansaughilfeposition, die der Saugfläche des zweiten Saughalteglieds, das an der dritten Annahmestation steht, zugewandt ist, hin und her bewegt wird, sowie
einem Bewegungsmechanismus (64) für das Ansaughilfsglied zur Hin- und Herbewegung des Ansaughilfsglieds zwischen der Evakuierungsstelle und der Ansaughilfeposition,
wobei das Ansaughilfsglied an der Ansaughilfeposition der Ansaugfläche des zweiten Saughalteglieds, das an der dritten Annahmestation steht, zugewandt ist und eine rückseitige Fläche in Sackbereitstellungsrichtung des durch das Greifglied gegriffenen leeren Sacks, der an der zweiten Übergabestation steht, stützt.

10. Vorrichtung (8) zur Bereitstellung leerer Säcke nach einem der Ansprüche 5 bis 8, wobei das Greifglied (34) Greifabschnitte umfasst, und der Greifabschnitt, der auf einer Rückseite des leeren Sacks in Sackbereitstellungsrichtung liegt wenn das Greifglied an der zweiten Übergabestelle steht, mit einem verlängerten Teilstück versehen ist, das der Saugfläche des zweiten Saughalteglieds, das an der dritten Annahmestation steht, zugewandt ist, und das verlängerte Teilstück die rückseitige Fläche des leeren Sacks in Sackbereitstellungsrichtung an der zweiten Übergabestelle stützt.

Revendications

1. Procédé de fourniture de sac vide, comprenant les étapes suivantes :

maintenir par aspiration, au moyen d'un premier élément ventouse (26), une surface supérieure à proximité d'une extrémité avant d'une direction de fourniture d'un sac vide se trouvant dans une position supérieure à l'intérieur d'un magasin de fourniture de sacs,
déplacer le premier élément ventouse (26) vers le haut pour soulever le sac vide,
saisir, au moyen d'un élément de préhension (31), une portion à proximité de l'extrémité avant du sac vide soulevé, puis relâcher le maintien par aspiration du sac par le premier élément ventouse (26),
déplacer l'élément de préhension (31) pour le transport du sac vide vers une première position spécifiée, et amener le sac vide dans une position sensiblement verticale,
maintenir par aspiration, au moyen d'un second élément ventouse (44, 45), une surface avant dans la direction de fourniture du sac vide se trouvant dans la position sensiblement verticale, et
déplacer le second élément ventouse (44, 45) pour transporter le sac vide vers une seconde position spécifiée de façon à délivrer le sac à un dispositif de traitement adjacent.

2. Procédé de fourniture de sac vide selon la revendication 1, dans lequel le second élément ventouse (44, 45) est déplacé pour transporter le sac vide vers la seconde position spécifiée pendant que le sac vide est amené dans une position sensiblement horizontale, et dans lequel le sac vide est ensuite délivre au dispositif de traitement.

3. Procédé de fourniture de sac vide selon la revendication 2, dans lequel une pluralité des seconds éléments ventouses (44, 45) sont prévus pour chaque sac vide, et la pluralité de seconds éléments ventouses maintiennent par aspiration au moins deux points verticaux sur la surface avant dans la direction de fourniture du sac vide.

4. Procédé de fourniture de sac vide selon la revendication 3, dans lequel
le sac vide (4) est placé en ayant l'un d'un côté embouchure de sac et d'un côté fond de sac orienté dans la direction de fourniture de sac à l'intérieur du magasin de fourniture de sacs, et
lors du passage du sac vide à la position sensiblement horizontale, un côté inférieur du sac vide se trouvant dans une position sensiblement verticale est tournée vers un côté avant dans la direction de fourniture de sac, inversant ainsi une orientation de côté embouchure du sac et côté fond du sac vide à partir d'une orientation de celui-ci lorsque le sac vide était à l'intérieur du magasin de fourniture de sacs.

5. Dispositif de fourniture de sac vide (8), comprenant :

un premier élément ventouse (26) qui effectue un mouvement de va-et-vient entre une première position de réception et une première position de délivrance, située au-dessus de la première position de réception, le premier élément ventouse maintenant par aspiration, à la première position de réception, une surface supérieure à proximité d'une extrémité avant dans une direction de fourniture du sac vide qui se trouve à une

position supérieure à l'intérieur d'un magasin de fourniture de sacs, puis soulevant le sac vide maintenu par aspiration lorsque le premier élément ventouse atteint la première position de délivrance ;
un premier mécanisme de déplacement d'élément ventouse, destiné à imprimer au premier élément ventouse un mouvement de va-et-vient entre la première position de réception et la première position de délivrance ;
un élément de préhension (31) qui effectue un mouvement de va-et-vient entre une seconde position de réception et une seconde position de délivrance, une surface de préhension de l'élément de préhension, lors du déplacement de celui-ci de la seconde position de réception à la seconde position de délivrance, passant d'un état sensiblement horizontal à un état sensiblement vertical, et l'élément de préhension, qui se trouve à la seconde position de réception, saisissant le sac vide à proximité de l'extrémité avant de celui-ci maintenue par aspiration par le premier élément ventouse, lequel se trouve à la première position de délivrance, et suspendant le sac vide saisi dans une position sensiblement verticale lorsque l'élément de préhension atteint la seconde position de délivrance ;
un mécanisme de déplacement (32) de l'élément de préhension destiné à imprimer à l'élément de préhension un mouvement de va-et-vient entre la seconde position de réception et la seconde position de délivrance ;
un second élément ventouse (44, 45) qui effectue un mouvement de va-et-vient entre une troisième position de réception et une troisième position de délivrance, le second élément ventouse situé à la troisième position de réception maintenant par aspiration une surface avant dans la direction de fourniture du sac vide saisi par l'élément de préhension lorsque le second élément ventouse atteint la seconde position de délivrance, puis délivre le sac vide à un dispositif de traitement adjacent lorsque le second élément ventouse atteint la troisième position de délivrance ; et
un second mécanisme de déplacement (46) d'élément ventouse, destiné à imprimer au second élément ventouse un mouvement de va-et-vient entre la troisième position de réception et la troisième position de délivrance.

6. Dispositif de fourniture de sac vide (8) selon la revendication 5, dans lequel le second mécanisme de déplacement d'élément ventouse fait passer une surface d'aspiration du second élément ventouse d'un état sensiblement vertical à un état sensiblement horizontal pendant que le second élément ventouse est déplacé de la troisième position de réception à la troisième position de délivrance.

7. Dispositif de fourniture de sac vide (8) selon la revendication 6, dans lequel une pluralité des seconds éléments ventouses sont prévus pour chaque sac vide, et la pluralité de seconds éléments ventouses situés dans une orientation verticale maintenant par aspiration au moins deux points verticaux sur la surface avant dans la direction de fourniture du sac vide.

8. Dispositif de fourniture de sac vide (8) selon la revendication 7, dans lequel le second mécanisme de déplacement d'élément ventouse fait passer la surface d'aspiration du second élément ventouse d'un état sensiblement vertical à un état sensiblement horizontal et de façon à être tournée vers le bas, pendant que le second élément ventouse est déplacé de la troisième position de réception à la troisième position de délivrance.

9. Dispositif de fourniture de sac vide (8) selon l'une quelconque des revendications 5 à 8, comprenant, en outre,
un élément d'aide à l'aspiration (63) installé au-dessous de la seconde position de délivrance de l'élément de préhension et déplacé en va-et-vient entre une position d'évacuation, qui évite une interférence entre l'élément de préhension et le sac vide saisi par l'élément de préhension, et une position d'aide à l'aspiration, située en regard de la surface d'aspiration du second élément ventouse se trouvant à la troisième position de réception, et
un mécanisme de déplacement (64) de l'élément d'aide à l'aspiration pour imprimer à l'élément d'aide à l'aspiration un mouvement de va-et-vient entre la position d'évacuation et la position d'aide à l'aspiration,
dans lequel, dans la position d'aide à l'aspiration, l'élément d'aide à l'aspiration est situé en regard de la surface d'aspiration du second élément ventouse se trouvant à la troisième position de réception et supporte une surface arrière dans la direction de fourniture du sac vide saisi par l'élément de préhension qui se trouve à la seconde position de délivrance.

10. Dispositif de fourniture de sac vide (8) selon l'une quelconque des revendications 5 à 8, dans lequel l'élément de préhension (31) est constitué de sections de préhension, et la section de préhension qui est positionnée sur un côté arrière dans la direction de fourniture du sac vide lorsque l'élément de préhension se trouve à la seconde position de délivrance, est pourvue d'une partie prolongée située en regard de la surface d'aspiration du second élément ventouse se trouvant à la troisième position de réception, et la partie prolongée supporte la surface arrière dans la direction de fourniture du sac vide à

la seconde position de délivrance.

FIG. 1

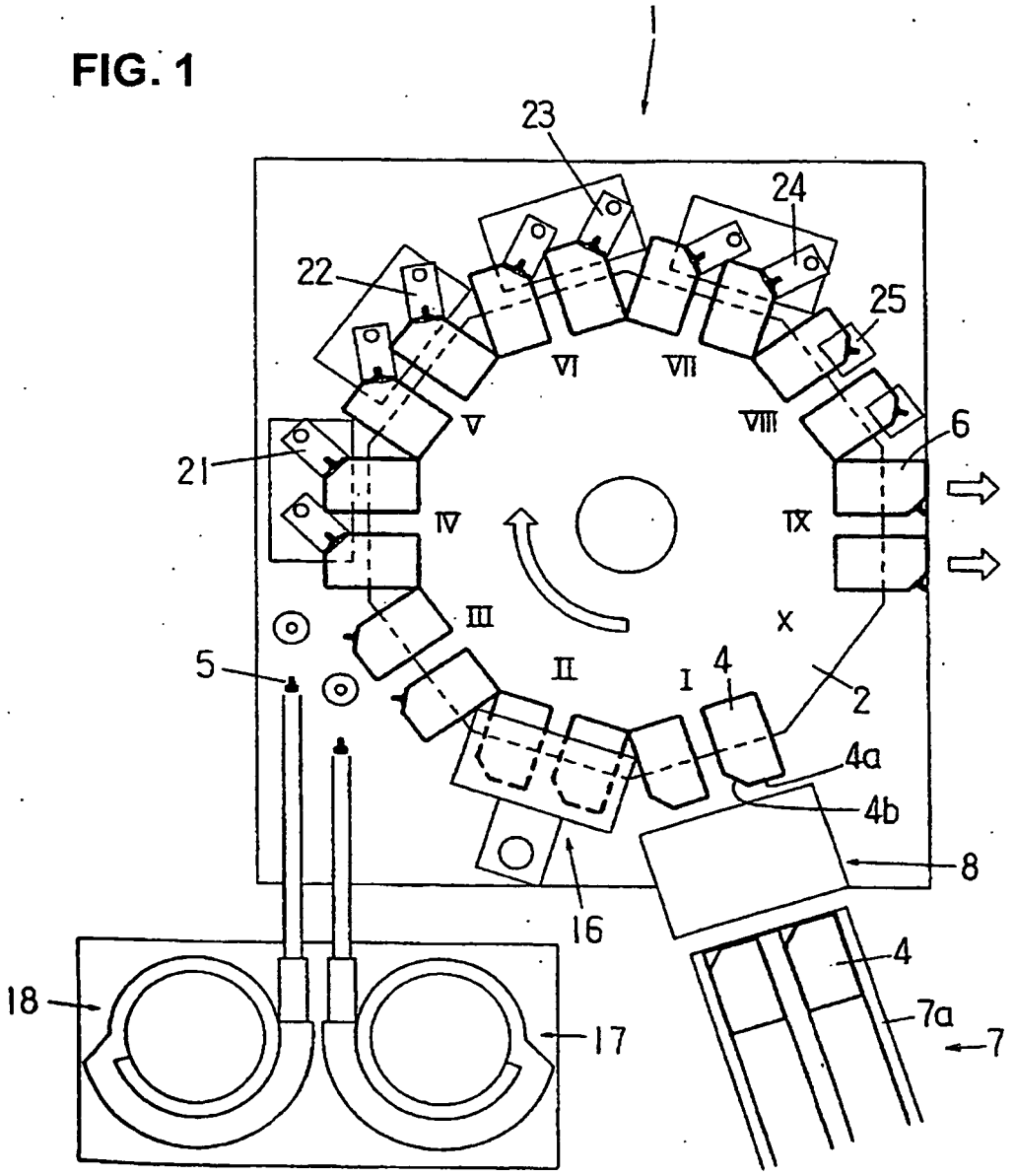
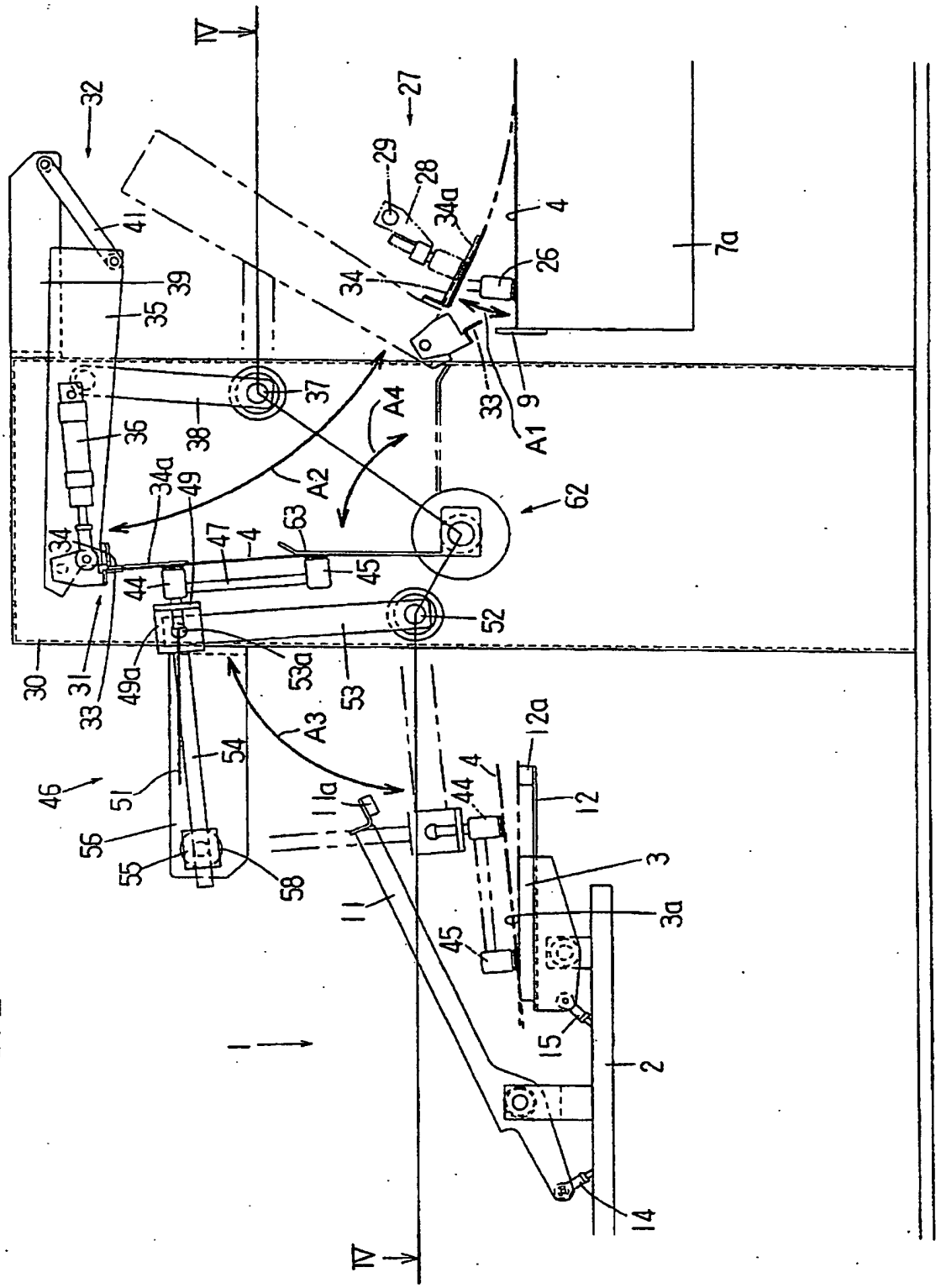

1
23
24
22
25
VI
VII
V
VIII
6
21
IV
IX
III
X
5
II
I
4
2
4a
4b
8
16
4
18
17
7a
7

FIG. 2


IV
32
41
39
35
27
29
28
34a
4
26
7a
34
33
9
A1
37
A4
36
38
A2
62
34a
49
63
47
4
34
45
44
52
30
31
33
49a
53a
53
A3
54
12a
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12
46
51
1a
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55
58
11
3a
45
15
2
14
IV
I

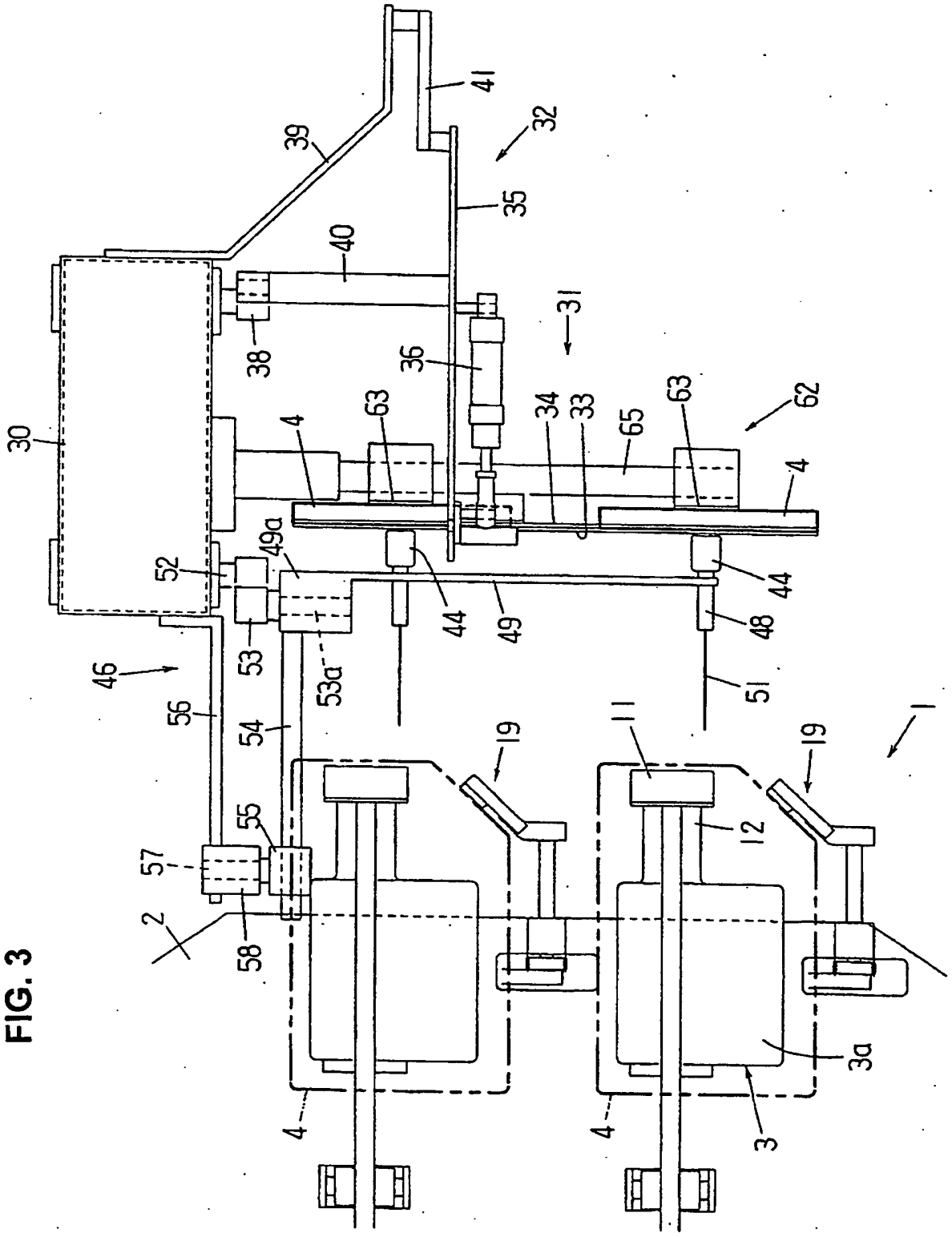

41
32
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31
38
36
63
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33
65
63
62
30
4
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49a
52
44
44
49
48
53
53a
51
46
56
54
19
11
19
1
55
12
57
2
58
3a
4
4
3

FIG. 3

FIG. 4

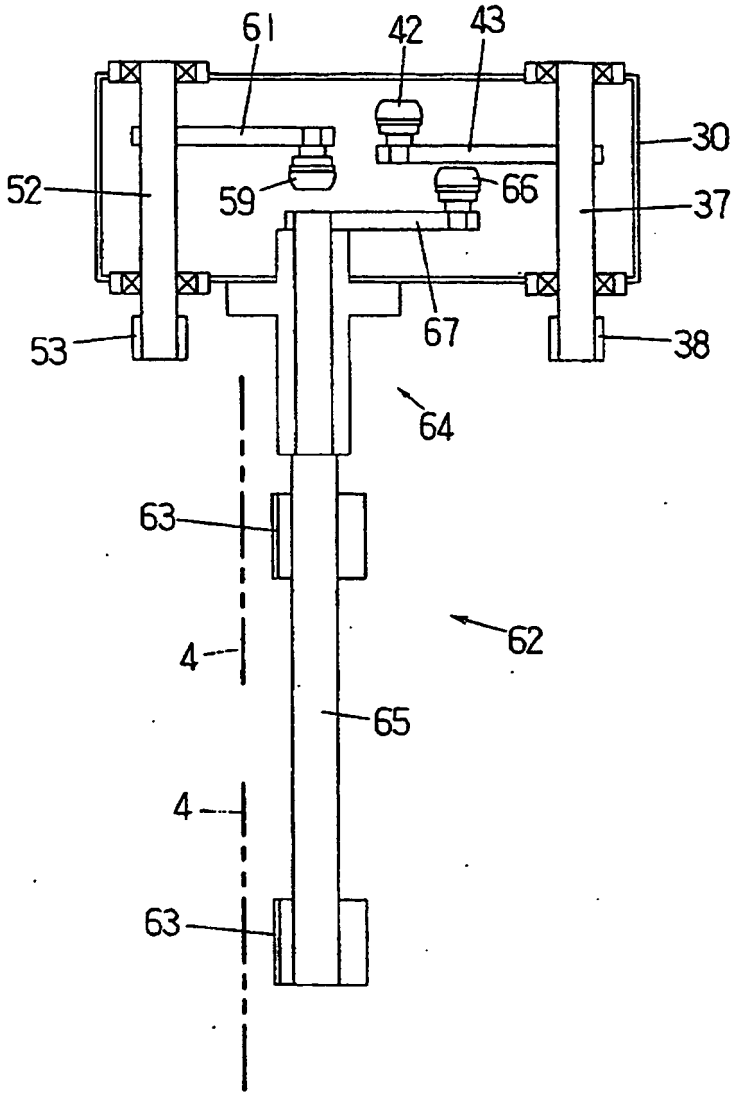
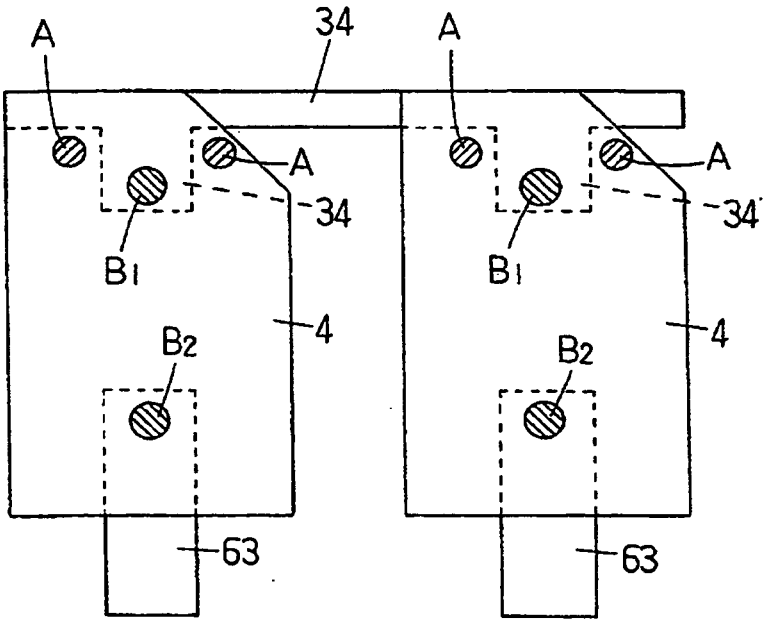


FIG. 5



REFERENCES CITED IN THE DESCRIPTION

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