EUROPEAN PATENT SPECIFICATION

Date of publication of patent specification: 24.11.93
Int. Cl.: B65B 43/12, B65B 69/00, B65H 1/30
Application number: 89116189.5
Date of filing: 01.09.89

Unpacking and feeding device for packing container blanks.

Priority: 01.09.88 JP 220025/88
Date of publication of application: 04.04.90 Bulletin 90/14
Publication of the grant of the patent: 24.11.93 Bulletin 93/47
Designated Contracting States: AT BE CH DE ES FR GB IT LI NL SE

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Description

The present invention relates to an unpacking and feeding device which automatically cuts and opens a package (C) being a bundle of a plurality of flattened container blanks (A) covered with an envelope (B) of packaging material on the outside.

Conventionally, various paper containers have been manufactured according to their application. For example, single-lift packing containers are widely used for packaging a liquid food product such as milk and juices, and as shown in Fig. 24 (A'), some have a parallelepipedic form.

The blanks for this type of packing container are invariably folded flat as shown in (A) of Fig. 23 for storage, transporting, and in order to facilitate other handling, and are bundled and packaged on the outside with an envelope (B) of packaging material as shown in Fig. 18.

As shown in Fig. 24, the blanks (A') raised into parallelepipedic form with a square-shaped cross section are sent to a mandrel wheel (E) of the packing machine (D) to seal the bottom before filling with liquid contents; however, in order to send the aforesaid blanks (A') to a mandrel wheel (E), the plurality of bare blanks (A) obtained by cutting and opening said envelope (B) of bundled package (C) must be supplied to a separate place other than the cutting position and be transported forward while raising them into parallelepipedic form with a square-shaped cross section.

Hence conventionally in most cases, the plurality of flattened blanks (A) are propped up on a platform before sending them to a mandrel wheel (E) (e.g., Jap. Pat. Pub. 62-201562).

Similarly, GB-A-2 132 174 discloses a device for delivering folding box blanks to a cartoning machine in which stacks of folded blanks are manually placed on a delivery belt for delivering to a store magazine from which the lowest blank is removed and erected by suction pads. The stacks of blanks have no envelope and the document is silent about unpacking stacks of blanks from an envelope.

Moreover, the cutting and opening work for said envelope (B) of package (C) involved manual work or a device like that shown in Jap. Pat. Pub. 62-271828 was used. The supply of the plurality of flattened blanks (A) to the aforesaid platform after cutting and opening, however, requires manual work or a supplying device like that shown in Jap. Pat. Pub. 62-201562.

Finally, after supplying to the platform, the flat blanks (A) must be raised into a parallelepipedic form with a square-shaped cross section in order to insert them in a mandrel wheel (E). There is a known device that grasps a propped up blank (A) with a suction head and pulls it out, while forming a parallelepipedic with a square-shaped cross section at the same time.

In order to prop up a plurality of flattened blanks (A) at least one horizontally long platform is necessary and the horizontal width of the equipment becomes equally long. Consequently, the equipment becomes disadvantageously large.

The supply of a plurality of bare blanks (A) after opening onto the platform becomes considerably inefficient under manual operation; furthermore, a certain bundle of blanks (A) is relatively heavy and forces considerable labor upon the worker. The device developed to automate this work in Jap. Pat. Pub. 62-201562 has an unexpectedly complex structure and also requires detailed operation.

In addition, when applying the flat blanks (A) supplied to the platform one at a time to the mandrel wheels (E) using the conventional raising device, the initial folding tendency remains to make the formation of square difficult. Thus, insertion to the mandrel wheels (E) does not proceed smoothly.

Incidentally, devices to automatically cut and open a package (C) bundling flattened blanks (A) and being covered on the outside with packaging material (B) and devices to automatically supply the plurality of bare blanks (A) after opening to a separate location from the cutting position have been variously developed individually; however, an ideal transport device that maximizes the characteristics of both devices and brings them together does not yet exist. Especially, when considering the series of processes beginning with raising the blanks (A) and sending them in parallelepipedic form with a square-shaped cross section shown in Fig. 24 into the packing machine (D), forming their bottoms, and filling the liquid contents at filling area (H), the plurality of bare blanks (A) after opening must be sent from some origin and automatically raised into parallelepipedic form with a square-shaped cross section and then sent to the packing machine. Conventional devices lacks reliability and are thus insufficient.

From DE-A-34 43 362 there has been known an unpacking device for removing stacks of copying paper from an envelope and feed them to a copying apparatus. A stack of flat folding boxes, unlike copying paper, has a tendency to smell owing to the resiliency of the folds, as soon as their envelope is cut open. The means disclosed in DE-A-34 43 362 for removing the paper stack from the envelope do not take into account such tendency and, this device is therefore not useful for unpacking flat folding blanks. Moreover the means disclosed in this document for cutting open the envelope whilst avoiding damage to the contents require very complicated control and guiding means.
which are designed to one paper size only and could not be adapted to different sizes.

It is therefore an object of the invention to furnish an unpacking and feeding device that eliminates the above mentioned problems and for a reliable automatic removal of stacks of latent folding boxes from an envelope without risk of damage for the folding boxes as with adaptability to different sizes of folding boxes.

To accomplish the aforementioned object the invention provides for unpacking and feeding container lengths which comprises

means for feeding a package, comprising a stack of flattened container blanks packed in an envelope, onto a platform;

holders engaging against a first portion of opposite side faces of said package;

suction pads for engaging said envelope material in a second portion of said opposite side faces;

first cutting means for cutting the envelope material along a first line vertical to said platform across said opposite side faces, while pulling said envelope material by the suction pads away from the container blanks to provide spaces between the envelope and the container blank;

second cutting means for cutting the envelope material along a second cutting line at right angles to said first line across the second portion of the opposite side faces;

third cutting means for cutting the envelope material across the side face joining said opposite side faces along third cutting line;

means for gripping and opening the parts of the envelope delimited by the first, second and third cutting lines; and

a robot with gripping means for pulling out said stack of container blanks from the opened envelope and to feed it to a main magazine, from where individual blanks can be extracted one by one and supplied to a following processing stage.

Further advantageous features of the device according to the invention are defined in the dependent claims.

The device according to the invention can advantageously be used in conjunction with a device for erecting the flat length discharged from the main magazine into an unfolded state, said device comprising a pair of discharging rollers and a front-and-back pair of pieces that engages the front-and-back rim edges of the flat blanket that passes through the pair of discharging rollers for deforming said blank into the square-shaped cross section of a parallelepiped container.

The aforesaid platform preferably can move either up or down to the opening position after cutting the packaging material (B) of the package (C) on said platform.

In addition to the aforesaid main magazine, it is preferable to place a separate storage magazine whereby the aforesaid robot can move between the platform, main magazine, and storage magazine.

The package (C) bundled with envelope (B) as shown in Fig. 18 is placed on the platform at the cutting position shown by chain line in Fig. 3.

The envelope (B) covering the outside of the plurality of flattened blanks (A) is cut at this position, and the cut envelope (B) is opened, for example, as shown in Fig. 17(g).

The plurality of bare blanks (A) after opening remain on the platform shown by the chain line in Fig. 13. The robot with a means for grasping comes over to pick up the plurality of blanks (A) on the platform, as shown by the solid line in Fig. 13. The robot's means for grasping grasps the plurality of bare blanks (A) after opening as shown in Fig. 17(b).

Next, this robot moves from the solid-line position of Fig. 1 to the place of the main magazine and inserts the plurality of bare blanks (A) into the main magazine at that position as shown in Fig. 17(i).

This way, merely supplying a package (C) bundling many blanks (A) covered with envelope (B) to the platform enables automatic cutting and opening of packaging material (B) and automatic supply of a plurality of bare blanks (A) after opening to the main magazine.

In this case, if the platform with the package (C) after cutting the envelope (B) moves either up or down to the opening position to differentiate between the cutting position and opening position of envelope (B), vertical space use can be maximized.

By placing a storage magazine separate from the main magazine whereby the aforesaid robot can move between the platform, main magazine, and storage magazine, blanks (A) remaining in the main magazine can be stored in the storage magazine if the succeeding manufacturing line stops, and fast exchange between different sizes and types of blank can take place between the main magazine and storage magazine.

The many blanks (A) supplied to the main magazine can be taken out one at a time from the main magazine with a suction pad, and then a lifting conveyor sends the blanks (A) taken out of the main magazine to a pair of discharging rollers as shown in Fig. 14. One flattened blank (A) that comes out from the discharging rollers has both its front and rear edge rims supported by a pair of pieces as shown in Fig. 15(a)-(d), and is finally raised into parallelepipedicform with a true square-shaped cross section as shown in Fig. 15(d). Thus, as shown in Fig. 16, this blank (A) can be sent to the mandrel wheel (E) for the following bottom-
forming process, and enables smooth loading onto the mandrel wheel (E).

A preferred embodiment of the present invention will be described with reference to the accompanying figures as follows:

Fig. 1 is the abbreviated front view of the entire device;

Fig. 2 is the planar view of the same;

Fig. 3 is the side view of the Fig. 1 viewed at the line III-III;

Fig. 4 is the side view of Fig. 1 viewed at the line IV-IV;

Fig. 5 is the enlarged planar view of only the package transporting device;

Fig. 6 is the profile of Fig. 5 at the line VI-VI;

Fig. 7 is the enlarged side view that shows the relationship between the platform of the packaging material cutting device and the pusher that pushes the package onto this platform;

Fig. 8 is the enlarged front view of only the platform of the packaging material cutting device for the package;

Fig. 9 is an abbreviated planar view of the entire packaging material cutting device for the package; shows the positional relationship between the two platforms above the platform which is part of the packaging material cutting device for the package;

Fig. 10 is a partially cut side view to explain that the platform which is part of the packaging material cutting device for the package can be tilted in the middle;

Fig. 11 is an enlarged side view of the opening device combined with the cutting device after the package is cut;

Fig. 12 is an enlarged side view of the robot with a pair of grasping means;

Fig. 14(a)-(f) are diagonal views in processing order of cutting and opening the package sent by the conveyor, of removing only the content blanks, and of supplying them to the main magazine;

Fig. 15 is a diagonal view of only the package;

Fig. 16 is a diagonal view of the cutting positions of the package;

Fig. 17 is a enlarged view of the opening operation of the package after cutting;

Fig. 18 is a enlarged side view of vertically cutting the two mutually opposing planes of the package and of inserting the plates from those cuts;

Fig. 19 is a cross-sectional view of the same;

Fig. 20 is a diagonal view of the flattened blanks;

Fig. 21 is a diagonal view of the parallelepipedically raised conditions with square-shaped cross sections.

Among packing container blanks there are parallelepipedic forms with square-shaped cross sections as shown in Fig. 21. This type of blank (A'), however, is invariably folded flat as shown in Fig. 23 at (A) for storage and transporting and in order to facilitate other handling. Many of these blanks are bundled and covered on the outside as shown in Fig. 15 with packaging material (B).

In the package (C), only the blanks must be send to the succeeding manufacturing line; therefore, the packaging material (B) covering the outside must be cut and opened. This operation takes place on the platform for this invention. This platform (1) is shown in Fig. 3, 4, 12 and 13, and the package (C) is placed on the platform (1).

In this embodiment, two conveyors (2), (2) send the package (C) in as shown in Fig. 3 and 9, and either alternately or continuously from one side pushes the package out to a storing and feeding device (3) located between the two conveyors (2), (2). As shown by the single-dot chain line in Fig. 6, the transport device rotates and then, as shown by the two-dot chain line, lowers, and finally, the package is pushed onto the platform (1) by pusher (4) shown in Fig. 6 and 7. Automatic supply of the package (C) to the two conveyors (2) and (2), is enabled by installing a selective supplying device (not illustrated) that can lift a package (C) on a palette and supply the two conveyors (2), (2).

The storing and feeding device (3) is equipped with a storage box (3a) that has a sideways L-shaped cross section as shown in Fig. 6, and the package (C) sent by the two conveyors (2), (2) is pushed either alternately or continuously from one side into the storage box (3a) from the two openings (3b) (Fig. 6) appearing on the left and right in Fig. 3. To alternately push the package (C) into the storage box (3a), for example, pushers (3c), (3c') can be positioned above the two conveyors (2), (2) as shown in Fig. 5, and the package (C) can be alternately moved from the solid-line position to the chain-line position of Fig. 5 by the cylinder (3d) of
pusher (3c) and the cylinder (3d') of pusher (3c'). In order to continuously store packages (C) to the storage box (3a) from one of the two openings (3b), only one of the two cylinders (3d), (3d') shall be operated and the other cylinder shall be stopped. This storage box (3a) can rotate as shown in Fig. 6 from the solid-line position to the single-dot chain-line position, and lower to the two-dot chain line position retaining its orientation as shown in the same figure. To rotate the storage box (3a) from the solid-line position to the single-dot chain-line position, for example, the storage box (3a) can be joined to the end of the rod of the cylinder (3e) with a lever (3f). When the cylinder (3e) rod pulls in from the solid-line position shown in Fig. 6, the storage box (3a) that was horizontal via the lever (3f) rotates 90 degrees as shown by the single-dot chain line in the same figure. To lower the storage box (3a) while retaining its orientation to the position indicated by the two-dot chain line in Fig. 6, the storage box (3a) can be joined directly to the rod (3g) of the cylinder (3g) that can move the storage box up and down, for example, in this way, the package (C) sent by the two conveyors (2), (2) can be either alternately or continuously from one side pushed into the storage box (3a), and its orientation can be rotated 90 degrees and lowered to the position shown by the two-dot chain line in Fig. 6. At the most lowered position of the transport device (3), a pusher (4) shown in Fig. 3 is installed. This pusher operates from one of the two openings (3b) of the aforesaid storage box (3a) to the other, i.e., from the right to the left in Fig. 7, and enables the package (C) to be pushed out from the storage box (3a). In this embodiment, at the most lowered position of the storage box (3a), the aforesaid platform (1) is waiting and is designed so that a part of the package (C) lowered from the storage box (3a) lands on this platform (1). Hence, the pusher (4) can immediately push the package (C) lowered from the storage box (3a) onto the platform (1). Until the storage box (3a) lowers, the pusher remains tilted as shown by the solid line in Fig. 7: however, right before ending or lowering motion of the storage box (3a), a cylinder (4a) renders the pusher vertical as shown by the chain line in the same figure, and while playing a roll of a guide, another cylinder (4b) retains the orientation and the pusher moves to the left of Fig. 7, effectively pushing the package (C) out of the storage box (3a) onto the platform (1).

The cutting and opening of the packaging material (B) of the package (C) on the platform (1) has been discussed. An embodiment of this device will now be described.

The packaging material (B) can be cut by applying thin cutting blades on the packaging material (B) and running them along. In this embodiment, the positions of applying the cutting blades on the packaging material (B) around the many blanks (A) in Fig. 19 are along the vertical lines shown by (c1) on the two mutually opposing perpendicular planes (C1), (C1), along the symmetrical horizontal lines (c2) from (c1) to the perpendicular plane (C2) that intersects perpendicularly with the two surfaces (C1), (C1), and along the connecting horizontal line (c3) between (c2) and (c2) on plane (C2). Cutting blades are positioned to the side of the package (C) on the platform (1) in order to cut these parts. The cutting blades that cut the vertical portion (c1), (c1) of the packaging material (B) are shown by (5) in Fig. 8; the cutting blades that cut the horizontal portion (c2), (c2) are shown by (6) in Fig. 9; the cutting blade that cuts the connecting horizontal portion (c3) between (c2) and (c2) is shown by (7) in Fig. 9.

As a means to move up and down cutting blades (5), (5) which are a pair on the left and right in Fig. 8, the embodiment shows cylinders (5a), (5a) located on the side of the platform (1). By applying the left and right pair of cutting blades (5), (5) to the package (C) on the platform (1) and running the blades along from the solid-line position of Fig. 8 to the chain-line position in the same figure, the portion (c1), (c1) of the packaging material (B) of the package (C) indicated in Fig. 16 can be cut. In addition in Fig. 5, cutting blades (5) have separate cylinders (5b) installed in order to move to the left and right separately from the cylinders (5a). These cylinders (5b) place cutting blades (5) temporarily in the back relative to the platform (1) (left and right outer sides of Fig. 8), and then advance them to the solid-line position in Fig. 8 in order to cut packaging material (B). After cutting, the cutting blades (5) are returned by the cylinders (5b), and lowered by the cylinders (5a).

The cutting blades (6) in Fig. 9 are positioned so that they emerge symmetrically vertical, and by advancing to the left when facing the platform (1) from the solid-line position in Fig. 9, the portion (c2), (c2) of the packaging material (B) of the package (C) on the platform (1) indicated in Fig. 16 can be cut. As a means for the pair of cutting blades (6), (6) to approach the platform and to return to the solid-line position in Fig. 9 after cutting the packaging material (B), the embodiment shows a cylinder (6a) that can move a frame (6a) that mounts the cutting blades (6), (6) to the left and right.

The cutting blade (7) is positioned as shown in Fig. 9. By advancing from the solid-line position in the direction of the arrow, the portion (c3) of the packaging material (B) of the package (C) on the platform (1) indicated in Fig. 16 can be cut. As a means for the cutting blade (7) to advance and to return to the solid-line position in Fig. 9 after cut
ting the packaging material (B), the embodiment shows cylinder (7a) that moves the cutting blade (7) up and down in Fig. 9.

When performing the aforesaid cuts, the preferred embodiment creates space (c5) between the rim edges of the blanks (A) that are packaged so the package (C) on the platform (1) does not move. Thus, applying and running the aforesaid cutting blades (5) along the packaging material (B) does not injure the blanks (A) of the package (C), while the package (C) remains held by holders (8), (9) and does not slip.

The portion (c1) cut by cutting blades (5) is in an open-mouth form. The preferred embodiment uses this in a skillful manner. As shown in Fig. 14 (e), ruler-like plates (10) are inserted into this portion. The plates (10) can be placed in the space (c5) as shown in Fig. 19 between the packaging material (B) pulled outward by suction pads (9), (9) and the packaged blanks (A). Thus, when cutting the portion (c2), (c2) as shown in Fig. 16, these plates (10) can be underlaid to prevent injury to the rim edges of packaged blanks (A). The outer surfaces of plates (10) should have longitudinal slots (10a). In this way, if the blade tips stay within the slots (10a) when the aforesaid cutting blades (6) run along horizontally and cut the packaging material (B), the blade tips do not fluctuate and the cutting position of packaging material (B) does not slip.

The ends of the inserted plates (10) from the cut portion (c1) of the package (C) stick outward from the other perpendicular plane (C2) of the package (C) as shown in Fig. 14 (e) and 21. Thus, space (c6) forms between packaging material (B) and rim edges of the packaged blanks (A) as shown in Fig. 18. In this way, cutting packaging material (B) on plane (C2) by cutting blade (7) does not injure the rim edges of packaged blanks (A). As shown in Fig. 18, if a slot (10f) is formed on the ends of the plates (10), so that the blade tip stays within the slot (10f) when the aforesaid cutting blade (7) runs along horizontally and cuts the packaging material (B), the blade tip does not fluctuate and the cutting position of packaging material (B) does not slip.

Regarding the insertion of places (10) shown in Fig. 14 (e) from the portion (c1) cut by cutting blades (5) along plane (C1) of the package (C), for example, one end of the oscillating lever (10c) centered around the pivoting axis (10b) shown in Fig. 7 can be joined to the plates (10), and the other end of said lever (10c) may be connected to the end of a cylinder (10d) rod with a lever (10e). When the cylinder (10d) rod shown with solid lines in Fig. 7 pulls in, the lever (10c) oscillates around pivoting axis (10b) via the lever (10e) as shown by the chain line in the same figure. Thus, the plates (10) shown with solid lines in Fig. 7 advance to the right of figure as the chain line shows, and successively insert from the ends to the package (C).

When performing the respective cutting operations described above, a back plate (11) is installed on the left side relative to Fig. 12 toward the back of the platform (1) in order to determine the position of the package (C) on the platform (1). During the respective cutting operations described above, this back plate (11) should be aligned with a plane (C3) of the package (C) (Fig. 16).

The holders (8) and suction pads (9) are on a separate platform (12) above the platform (1) as shown in Fig. 9, and the back plate (11) is also on a separate platform (13) above the platform (12) as shown in Fig. 10. The platform (1) can move relative to the frame (14) with a cylinder (1a) as shown in Fig. 12. The platform (12) can move relative to the platform (1) with a separate cylinder (1b) mounted on the platform (1) and with a cylinder (12a) mounted on the platform (12) as shown in Fig. 9. The platform (13) can move relative to the platform (12) with a separate cylinder (12b) mounted on the platform (12) and with a cylinder (13a) mounted on the platform (13) as shown in Fig. 10. By appropriate control of these cylinders whereby all are operated or part of them are not, the amount of movement of the platforms (1), (12), and (13) and the mutual position relations between the platforms can be freely modified. In this way, even in the event that the length of blanks (A) or the length L. (Fig. 15) of the package (C) of these bundled with the packaging material (B) differs according to a difference in volume, by providing a constant position of one plane (C2) for each package before placing on the platform (1), for example, the platform (1) position to support one package, the positions of the cutting blades (5), holders (8), suction pads (9) and back plate (11) can be freely modified according to the length of the package. This means that when the package to be cut has a different length, the supporting platform (1) meets the package at the prescribed location and the cutting blades (5) can cut at the prescribed position on the mutually opposing two perpendicular planes (C1), (C1) for each package. In other words, even when handling packages of different lengths, the packaging material (B) can be cut vertically at the prescribed position for each package.

In this way, the packaging material (B) of the package (C) on the platform (1) can be cut, and in this case the platform (1) is located at the solid-line position of Fig. 3. This position is the cutting position. In the preferred embodiment, the platform (1) lowers from this cutting position as shown by the chain line in Fig. 3 where the packaging material (B) is opened after cutting. In this way, vertical space usage is maximized. To lower the platform...
(1) from the solid-line position of Fig. 3 to the chain-line position of the same figure, for example, the cylinder (1c) in Fig. 9 can be used to lower the entire platform (1) along with the frame (14).

As a means to open the packaging material (B) after cutting in the preferred embodiment, Fig. 12 shows a lever (15) that grasps the upper corner of cut package (C') (Fig. 19) on the platform (1), a catch (16) that can move from below upward, and a catch (17) that can move from above downward. The lower end of the lever (15) is pivotedly attached to the rod (15b) of a cylinder (15a). According to the action of the cylinder (15a), the rod (15b) extends toward the arrow direction of Fig. 12, and the rod moves from its solid-line position in the same figure as shown by the chain line. Consequently, the end of the lever (15) grasps the upper corner the package (C'), and then the mouth of cut packaging material (B) opens slightly as shown in Fig. 17. The end of the catch (16) enters this mouth, catches the edge (b) of the open mouth, and rises. Thus, the upper half (b1) of packaging material (B) opens as shown in Fig. 14 (g) and 20. Next, the upper catch (17) lowers and its end catches the edge of the open mouth (b') of (b2) in Fig. 17 of packaging material (B), and lowers. Thus, the lower half (b2) of packaging material (B) opens as shown in Fig. 14 (g) and 20. In this way, opening proceeds for the package (C') after cutting on the platform (1). This opening operation, besides the preferred embodiment, can proceed by ripping off the packaging material (B) after cutting by pulling on any of the planes of package (C') after cutting with suction pads.

Once opened, the packaging material (B) becomes unneeded, and only the contents need to be taken. The contents are stored first in the main magazine (F), taken out and sent one at a time to the next process, raised into parallellepipedic form with a square-shaped cross section, and finally sent to the mandrel wheels (E) of the packaging machine (D) in order to form the bottom of the blanks (A') in a parallellepipedic form with a square-shaped cross section. In the present invention, a robot performs the operation consisting of removing only the blanks (A) after opening and supplying them to the main magazine (F).

This robot is numbered (18) in Fig. 1 and 3, and at least can move between the platform (1) after opening and main magazine (F). In the preferred embodiment, there are two main magazines (F) as shown in Fig. 1, and the robot (18) should run along a guide rail (19) locate between the platform (1) and the two main magazines (F), (F).

This robot (18) has a means of grasping formed by a pair of upper and lower forks (18a), (18a) as shown in Fig. 13, and approaches the opened package (C") on the platform (1), to remove only the many, bare blanks (A) as shown in Fig. 14 (h) with the upper and lower forks (18a), (18a), runs along the guide rail (19) toward the main magazine (F), and supplies the many blanks (A) grasped with the upper and lower forks (18a), (18a), to either of the two magazines (F), (F) as shown in Fig. 14 (i). The upper and lower forks (18a), (18a) can freely change their mutual distance with the two cylinders (18b), (18c) as needed as shown in Fig. 13. When removing the many, bare blanks (A) from the platform (1), supplying them to the main magazine (F), and removing the remaining blanks (A) in the main magazine (F) (discussed later), the pair of forks (18a), (18a) should approach and return from the platform (1) and main magazine (F). To enable this, for example, as shown in the preferred embodiment, the base (18d) of the robot (18) should slide to the left from the solid-line position of Fig. 15 along the guide rail (18e) of the rack (18f). This base (18d) should be lowered to the solid-line position in Fig. 15 when it moves between the platform (1) and main magazine (F).

In the preferred embodiment, the portion (1d) in front of the platform (1) tilts as shown by the chain line in Fig. 11. In this way, the lower fork of the pair of forks (18a), (18a) does not contact the platform (1) when it picks up the many, bare blanks (A) on the platform (1), and can enter the place where the said blanks are exposed outside of the packaging material (B).

Again in the preferred embodiment, there is a storage magazine (G) separate from the main magazine (F) as shown in Fig. 1, and the aforesaid guide rail (19) extends to this portion. This storage magazine (G) can store remaining blanks (A) in the main magazine (F) when the succeeding manufacturing line stops, or can speed up exchanges between blanks of a different size or type between the main magazine (F) and storage magazine (G).

Unillustrated suction pads remove the many blanks (A) supplied to the main magazine (F) by the robot (18) one at a time, and the main conveyor (20) located directly below sends the blanks forward. In the preferred embodiment, there are two main magazines (F), and their bottom positions are differentiated heightwise. The continuing main conveyors (20) are also positioned in two levels, upper and lower, as shown in Fig. 4. The lower main conveyor (20) extends further than the upper main conveyor as shown in Fig. 1.

In order to automatically supply the many, bare blanks (A) after opening to the main magazine (F) tilted approximately 18° the robot (18) forks (18a), (18a) should also be tilted approximately 18°. In the preferred embodiment, the robot (18) rack (18h), as shown in Fig. 13 by the chain lines, is entirely tilted. This rack (18f) on the platform (1) is horizontal when the many, bare blanks (A) are
removed from the platform (1), but tilts later as shown by the chain lines in Fig. 18 and runs to the main magazine (F) location. In order to tilt the rack (18b) as shown in Fig. 13, for example, a cylinder (18h) can be mounted to the main base (18g) tilted along the guide rail (19) and the end of its rod can be connected to the rack (18b). By operating the cylinder (18h) so that the cylinder (18h) rod can pull in, the rack (18b) can be tilted relative to the main base (18g), and by operating the cylinder (18h) in reverse, the rack (18b) can return to its horizontal orientation.

In other drawings, (29) (Fig. 12) is the pusher to push out packaging material which is the shell after the many blanks (A) are removed by the pair of forks (18a), (18a). The pusher (29) can advance to the chain-line position from the solid-line position in Fig. 12 according to cylinder (29a) movement. The packaging material shells pushed out by the pusher can be disposed of with a suitable, unillustrated device.

Effects of the Invention

According to the invention a package that bundles many, flattened blanks for packing containers (A) is cut and opened automatically on a platform, and only the contents which are many blanks (A) are automatically taken out and automatically supplied to the main magazine. Thus, these series of transporting operations are completely unmanned and quite efficient. Since the many, flattened blanks (A) can be stored in a stacked fashion at the main magazine, the horizontal width of the unit can be smaller compared to conventional devices that propped up the blanks.

Claims

1. A device for unpacking and feeding container blanks, comprising:
   means for feeding a package (C), comprising a stack of flattened container blanks (A) packed in an envelope (B), onto a platform (1);
   holders (8) engaging against a first portion of opposite side faces of said package (B);
   suction pads (9) for engaging said envelope material in a second portion of said opposite side faces;
   first cutting means (5) for cutting the envelope material along a first line (c1) vertical to said platform (1) across said opposite side faces, while pulling said envelope material by the suction pads (9) away from the container blanks to provide spaces (c2) between the envelope and the container blank;
   second cutting means (6) for cutting the envelope material along a second cutting line (c2) at right angles to said first line (c1) across the second portion of the opposite side faces;
   third cutting means (7) for cutting the envelope material across the side face joining said opposite side faces along third cutting line (c3); means (15, 16, 17) for gripping and opening the parts of the envelope delimited by the first, second and third cutting lines (c1, c2, c3); and
   a robot with gripping means (18) for pulling out said stack of container blanks from the opened envelope and to feed it to a main magazine, from where individual blanks can be extracted one by one and supplied to a following processing stage.

2. A device according to claim 1, comprising a pair of blades (10) insertable into said spaces (c3) through the cuts made by said first cutting means (5), said blades having grooves (10a) formed along the length thereof and slots (10f) formed at the ends, for accommodating said second and third cutting means (6, 7) during cutting.

3. A device according to claim 2, wherein said holders (8) and suction pads (9) are mounted on a second platform (12), and a back plate (11) for defining the position of said package is mounted on a third platform (13), said second and third platforms being movable independently of said first platform (1) to accommodate different sizes of the package (C).

4. A device according to claim 3, in which the aforesaid platform (1) moves either up or down to an opening position opposite said opening means (15, 16, 17) and said robot with gripping means (18) after cutting the envelope material (B) of the package (C) on said platform (1).

Patentansprüche

1. Vorrichtung zum Auspacken und Zuführen von Behälter-Zuschnitt, umfassend: Mittel zum Zuführen einer Packung (C), die einen in einer Umhüllung (B) verpackten Stapel von flachgelegten Behälterzuschnitten (A) umfaßt, auf eine Plattform (1);
   Halter (8), die an einem ersten Abschnitt von einander gegenüberliegenden Seitenflächen der Packung (B) angerieben;
   Saugköpfe (9) für das Einwirken auf das Umhüllungsmaterial an einem zweiten Abschnitt der einander gegenüberliegenden Seitenflächen;
   erste Schneidemittel (5) zum Aufschneiden des Umhüllungsmaterials entlang einer ersten Linie.
(c1) vertikal zu der Plattform (1) quer über die gegenüberliegenden Seitenflächen, während das Umhüllungsmaterial durch die Saugköpfe (9) von den Behälterzuschneidern weggezogen wird zur Bildung von Zwischenräumen (c5) zwischen der Umhüllung und den Behälterzuschneidern; zweite Schneidmittel (6) zum Aufschneiden des Umhüllungsmaterials längs einer zweiten Schneidlinie (c2) rechtwinklig zu der ersten Linie (c1) quer über den zweiten Teil der gegenüberliegenden Seitenflächen; dritte Schneidmittel (7) zum Aufschneiden des Umhüllungsmaterials entlang einer dritten Schneidlinie (c3) quer über die Seitenfläche, die die einander gegenüberliegenden Seitenflächen verbindet; Mittel (15, 16, 17) zum Ergreifen und Öffnen der von der ersten, zweiten und dritten Schneidlinie (c1, c2, c3) begrenzten Teile der Umhüllung; und einen Roboter mit Greifmitteln (18) zum Herausziehen des Stapels von Behälterzuschneidern aus der geöffneten Umhüllung und zu dessen Zuführung zu einem Hauptmagazin, aus dem einzelne Zuschneideinheiten nacheinander abgezogen und einer nachfolgenden Verarbeitungsstufe zugeführt werden können.

2. Vorrichtung nach Anspruch 1, mit einem Paar von Schwertern (10), die durch die von den ersten Schneidmitteln (5) gebildeten Schnitte in die Zwischenräume (5) einführbar sind, wobei an den Schwertern über ihre Länge verlaufende Nuten (10a) sowie Einschnitte (10f) an den Enden ausgebildet sind für die Aufnahme der zweiten und dritten Schneidmittel (6, 7) während des Schneidens.

3. Vorrichtung nach Anspruch 2, bei der die Katzer (8) und Saugeinrichtungen (9) auf einer zweiten Plattform (12) angeordnet sind und eine Rückplatte (11) zum Definieren der Position der Packung an einer dritten Plattform (13) angeordnet ist, wobei die zweite und dritte Plattform unabhängig von der ersten Plattform bewegbar sind, zur Anpassung an verschiedene Größen der Packung (C).

4. Vorrichtung nach Anspruch 3, bei der die Plattform (1) sich nach dem Schneiden des Umhüllungsmaterials (B) der Packung (C) auf der Plattform (1) nach oben oder unten bewegt in eine Öffnungsposition, die gegenüber den Öffnungsmitteilen (15, 16, 17) und dem Roboter mit Greifmitteln (18) liegt.

Revendications

1. Dispositif pour déballer et faire avancer des flans de récipients, comportant:
   - des moyens pour faire avancer un emballage (C), comprenant une pile de flans aplatis (A) pour récipients, emballés dans une enveloppe (B), sur une plate-forme (1);
   - des éléments (B) de maintien portant contre une première partie de faces latérales opposées dudit emballage (B);
   - des ventouses (9) destinées à porter contre ladite matière de l'enveloppe dans une seconde partie désdites faces latérales opposées;
   - des premiers moyens de coupe (5) destinés à couper la matière de l'enveloppe suivant une première ligne (c1) perpendiculaire à ladite plate-forme (1) à travers lesdites faces latérales opposées, en même temps que la matière de ladite enveloppe est tirée par les ventouses (9) à l'écart des flans de récipients pour ménager des espaces (c2) entre l'enveloppe et les flans de récipients;
   - des deuxième moyens de coupe (6) destinés à couper la matière de l'enveloppe suivant une deuxième ligne de coupe (c2) perpendiculaire à ladite première ligne (c1) à travers la seconde partie des faces latérales opposées;
   - des troisièmes moyens de coupe (7) destinés à couper la matière de l'enveloppe à travers la face latérale joignant lesdites faces latérales opposées suivant une troisième ligne de coupe (c3);
   - des moyens (15, 16, 17) destinés à saisir et ouvrir les parties de l'enveloppe délimitées par les première, deuxième et troisième lignes de coupe (c1, c2, c3) ;
   - un robot comportant des moyens (18) de préhension pour retirer pale pile de flans de récipients de l'enveloppe ouverte et la faire avancer jusqu'à un magasin principal d'où des flans individuels peuvent être extraits un par un et amenés à une étape de traitement suivante.

2. Dispositif selon la revendication 1, comportant deux lames (10) pouvant être insérées dans lesdits espaces (c2) à travers les coupes pratiquées par lesdits premiers moyens de coupe (5), lesdites lames ayant des gorges (10a) formées sur leur longueur et des encoches (10f) formées aux extrémités, pour loger lesdits deuxième et troisième moyens de coupe (6, 7) pendant une coupe.

3. Dispositif selon la revendication 2, dans lequel lesdits éléments de maintien (8) et lesdites
ventouses (9) sont montés sur une deuxième plate-forme (12), et une plaque (11) de dossier pour définir la position dudit emballage est montée sur une troisième plate-forme (13), les-dites deuxième et troisième plates-formes étant mobiles indépendamment de ladite première plate-forme (1) pour recevoir différentes dimensions de l'emballage (C).

4. Dispositif selon la revendication 3, dans lequel la plate-forme précitée (1) se déplace vers le haut ou vers le bas jusqu'à une position d'ouverture opposée auxdits moyens d'ouverture (15, 16, 17) et audit robot pourvu de moyens de préhension (18) après une coupe de la matière (B) de l'enveloppe d'emballage (C) sur ladite plate-forme (1).