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(54) **Process and apparatus for automatically feeding a conveyor with carton blanks taken directly from bowl containers**

Vorrichtung und Verfahren zum selbsttätigten Zuführen von direkt aus einer Schachtel genommenen Kartenzuschnitten zu einem Transporteur

Procédé et dispositif pour alimenter automatiquement un convoyeur avec des flans pris directement d'une boîte

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(56) References cited:
US-A- 4 635 428

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Description

The present invention relates to the technical field concerned with packaging, and more particularly it relates to the feeding of a conveyor with carton blanks, this conveyor being connected with a packaging machine.

Stacks of carton blanks are often placed into containers, from which they are taken out before they are transferred and placed on a conveyor.

It is obvious that while the packaging machine is working a sufficient quantity of carton blanks can be located on the conveyor, so that a continuous production cycle is assured.

Presently the withdrawal of the blank stacks from the containers and the subsequent transferring of them to the conveyor are performed manually by personnel.

Obviously, this fact leads to high cost in man power and further, does not always assure a correct working for the packaging machine.

From the US-A-4.635.428 it known an automatic apparatus for supplying flattened cardboard boxes or work units to an automatic packing machine. The apparatus comprises a first belt conveyor on which the work units are placed groupwise in a standing posture closely in contact with each other, a second belt conveyor onto which the work units on the first are transferred while maintaining them upright, a holding bracket slippingly disposed on the first belt conveyor, and retaining means provided at the juncture of the first and second belt conveyors.

The holding bracket is adapted to be borne by friction so as to hold and push the work units upright in close contact and to slip on the first conveyor belt owing to the reaction from the work.

The retaining means comprises two holding pins which are kept retracted under the belts until the work has been completely transferred onto the second belt conveyor and then project above the belt conveyor so as to hold the work units from the rear to prevent them from falling backward.

In the prior art apparatus, however, the container holding the work units to be transferred to the conveyor, cannot be collocated in close relation to each other, because the arms of the pickup means swing upwardly to clamp a group of work units.

For the same reason, between the groups of work units transferred to the conveyor spaces must be left to allow swing motion for the arms.

The object of the present invention is to propose a process according to which the conveyor connected with a packaging machine is automatically fed with carton blanks taken out directly from a related bowl container.

A further object of the present invention is to provide an apparatus that carries out the process mentioned above and that incorporates simple technical features, thus offering reliability and functionality, and that also is versatile in its use.

The objects mentioned above are obtained by means of the process and apparatus as described in the claims.

The technical features of the invention are pointed out in the following description, with reference to the accompanying drawings in which:

- Fig. 1 is a perspective view of a bowl container filled with a stack of carton blanks;
- Figs 2, 3, 4 and 5 are side views of the subject apparatus as seen in subsequent processing phases while feeding the conveyor with a stack of blanks;
- Figs 6 and 7 illustrate the subject apparatus partially seen from its side, in further processing phases;
- Fig. 8 illustrates the apparatus as seen from its side at the end of the feeding of a carton blank stack;
- Fig. 9 illustrates a cross-section of the subject apparatus taken along the line IX-IX of Fig. 7;
- Fig. 10 illustrates a cross-section of the subject apparatus taken along the line X-X of Fig. 8.

With reference to the figures mentioned above, the reference numeral 1 indicates a stack of carton blanks 2 packed into a bowl container 3 made of cardboard or the like.

Reference numeral 4 indicates a side of an operating unit 5 that is part of the subject apparatus.

The operating unit 5 has the task of taking a stack 1 of carton blanks out of the container 3 and to transfer this stack 1 onto a conveyor 6.

The conveyor 6 includes, for example, a conventional transport line comprising two parallel belts placed side by side and movable in the direction as indicated by the arrow A.

Also the containers 3 to be emptied are located on the conveyor 6, one after another.

The operating unit 5 is movable along guiding means 7, that are placed lengthwise over the conveyor 6.

The operating unit 5 is adapted for reciprocating from a blank stack taking out station 9 to a blank release station 10, where the stack of blanks just taken is positioned immediately after a stack of blanks previously fed to the conveyor.

The operating unit 5 is made to reciprocate by proper actuating means 8.

A slide 12 is associated to the side 4 of the operating unit 5 and is movable vertically.

The slide 12 is reciprocated by related actuating means 13 from a lowered position, where it clamps a stack 1 of carton blanks 2, and a raised position, located over the conveyor 6.

The slide 12 is equipped with means 14 for picking up the stack 1 that is to be lifted up and transferred.

The pickup means substantially include a clamp constituted by two jaws 15a and 15b, which are indicated as front jaw and rear jaw respectively, with respect to the advancement direction A.

The jaws 15a and 15b are operated by respective actuating means 16a, 16b so as to open and close.

In particular, the front jaw 15a is operated in such a way that it moves forewardly with a short oscillating stroke, over the conveyor 6.

The front jaw 15a is equipped with cutting means 17 fastened to its forward facing part and adapted to cut a corresponding wall of the container 3, as better described in the following.

Under the side 4 there are also provided pressing means 18, which are horizontally oriented and operated by proper actuating means 19 so as to move vertically.

The pressing means 18 pass through vertical slots 20 made in the jaws 15a and 15b (this can be seen in fig. 9).

Means 21 are provided for stopping a container 3 to be emptied at the picking up station 9.

These stopping means 21 are operated vertically by related actuating means 22, so that when they are in a raised position, they protrude over the horizontal surface of the conveyor 6.

A suction head 23, provided with conventional suction means, is located at the picking up station 9, upstream of the stopping means 21, and under the conveyor 6.

The suction head 23 can be moved vertically by actuating means 24.

When the suction head is in a raised position, it grips the bottom of an undergoing container 3.

Additional suction means 25 are located along the conveyor and upstream of the previous ones, and they are adapted to engage a container 3 adjacent to the one undergoing.

Pushing aside means 26 operate at the picking up station and substantially include an ejecting member 27 adapted to reciprocate according to a direction that is transverse in respect of the conveyor 6, so that the empty containers are pushed aside (as shown in fig. 10).

The blank feeding process carried out by means of the apparatus described herein, includes trasporting along the conveyor the containers 3 holding the stacks 1, one after the other, up to the picking up station 9.

When at this station, the leading container 3 is stopped by the stopping means 21 which protrude over the transporting surface of the conveyor 6 (fig. 2).

Proper sensing means, that are not shown in the drawings and that which are located at the picking up station 9, detect the presence of the stack 1 of blanks to be picked up.

The container 3 holding this stack 1 of blanks 2, is kept at the station 9 by the suction head 23 that has been moved to the raised position.

The slide 12 is then made to move downwards by the operating unit 5, up to a stack 1 pick-up position.

When the slide is in this position, the jaws 15a, 15b of the pickup means 14 secured to the slide, are made to move toward each other so as to slightly clamp the stack 1 of blank 2 in the portion that protrudes from the container 3 (fig. 3).

The pickup means 14 are then made to further move downwards, so that the jaws 15a, 15b insert into the container 3, up to its bottom.

In this way, the cutting means 17 secured to the front jaw 15a rip the side wall of the container 3 that is made of weak material (fig. 4).

In proper time relation, the stopping means 21 are made to lower under the conveyor 6, while the suction head 23 keeps on gripping the bottom of the container 3, so that the container is held at the picking up station 9.

The stack 1 of blanks 2 picked up by the jaws 15a, 15b of the pickup means 14, is then trasferred to the release station 10 by the operating unit 5, that moves along the guiding means 7.

This stack 1 of blanks 2 moves along the conveyor 6 until it reaches the end of a row 11 of blanks which were previously fed to the conveyor 6 (fig. 5)

At the same time the stopping means 21 are made to rise so as to protrude again over the transport surface of the conveyor 6.

At the release station 10, the front jaw 15a of the pickup means 14 is first released, as shown with dashed line 23 in Fig. 5, so as to allow the blanks 2, previoulsy clamped by the pickup means 14, to slightly slant forward. (Fig. 6).

Then the pressing means 18 mounted in the underside of the slide 12, are made to lower so as to press on the stack 1 of blanks 2. Therefore the blanks 2, that are slightly slanting (as illustrated with dashed line in fig. 7), progressively go to lay on the row of blanks 11 that were previoulsy fed over the conveyor.

This action progresses thus following the opening of the jaw 15a (Fig. 7).

It should be noted that the oscillating motion of the front jaw 15a, on a plane lengthwise in respect of the conveyor 6, avoids the jaw to strike against the blanks that are laying on the coveyor 6.

Once the tipping of the blanks 2 on the conveyor 6 has been completed, the rear jaw 15b is made to open while the slide 12 is moved upwards up to the risen position.

Also the pressing means 18 are risen and the operating unit 5 is moved back to the picking up station 9 (Fig. 8).

In proper time relation, the suction head 23 releases the container 3 that was emptied, so that it can be pushed aside from the picking up station 9.

To this purpose the next container 3, from which the stack 1 of blanks 2 is to be taken out, is kept on the conveyor 6 by the additional suction means 25.

The container 3 already empty is instead pushed aside by the ejector 27 that operates moving along a direction transverse to the conveyor 6 (fig. 10).

The station 9 is in this way set up for a subsequent picking up.

The process herein described allows to perform automatically the feeding of a conveyor with stacks of blanks that are taken out directly from their related bowl container.

This process is performed by the apparatus herein described which incorporates a simple feature that surely works well.

The trasferring of the container 3, holding the stacks 1 of blanks 2, to the conveyor 6 can be periodically carried out by an operator.

The operator loads the conveyor 6 with a number of containers, until the transporting line is full.

It is otherwise possible to employ, for this purpose, a proper automatic unit that is adapted to pick up the containers from a pallet, or from any other suitable support, and to put them on the conveyor 6.

This automatic unit can be controlled by sensing means, that detect the containers being lacking on the transport line.

It is also possible to charge an operator with the task of periodically placing the load of a pallet on an additional conveyor equipped with a magazine or buffer.

The magazine then automatically feeds the transport line at the picking up station.

Claims

1. Process for automatically feeding a conveyor with stacks of blanks, these stacks being directly taken out from bowl containers, wherein a stack (1) of blanks (2) is clamped by pickup means (14) that are vertically movable at a picking up station (9);
said process being characterised in that it includes:
ripping the leading edge of a bowl container (3) where a stack (1) of blanks (2) is located;
transferring said stack (1) of blanks to a release station (10) where said blanks (2) are placed behind row (11) of blanks previously fed to the conveyor (6), in the meanwhile keeping said container (3) at said picking up station (9);
moving forward a front jaw means (15a) of said pickup means (14), so as to allow said blanks (2) placed behind said row (11) on said conveyor (6), to slightly slant forward;
pressing on said stack (1) of blanks (2) in synchrony with the forward displacement of a rear jaw means of said pickup means (14) at the release station (10), so as to complete the tipping of said blanks (2);
pushing aside the container (3) emptied at the picking up station (9).

2. Process as in claim 1, characterised in that the said pickup means, to rip the leading wall of the container holding the stack (1) of blanks (2), is moved further downwardly along the sides of said stack before transferring the same stack.

3. Apparatus for automatically feeding a conveyor with stacks of blanks, these stacks being directly taken out from related bowl containers, the said apparatus including:
an operating unit (5) longitudinally movable over a conveyor (6) from a station (9), where a stack (1) of blanks (2) is picked up from a respective bowl container (3), to a station (10), where said blanks (2) are released and located behind a row (11) of blanks previously fed to said conveyor (6);
means (14) including jaws (15a, 15b), front jaw and rear jaw respectively, for picking up said stack (1) of blanks (2), said pickup means being carried by said operating unit (5) and movable vertically between a lowered position, in which they pick up a stack (1) of blanks (2), and a position risen over the conveyor (6);
the apparatus is characterised in that the said jaws (15a,15b) are adapted to be displaced independently one from the other, by respective actuating means (16a,16b), when at said picking up station (9) and release station (10), with the said front jaw (15a) being designed to slightly move forward, when said pickup means (14) open, on a plane that is lengthwise in respect of said conveyor (6), so as to allow said blanks (2) placed behind said row (11) to slightly slant.

4. Apparatus according to claim 3, characterised in that it also includes:
means (21, 23) adapted to hold said container (3) at said picking up station (9);
means (26) for pushing aside a container (3) already emptied at said picking up station (9).

5. Apparatus as in claim 3, characterised in that said pickup means (14) are equipped in their front with cutting means (17), adapted to rip a corre sponding wall of said container (3) when a stack (1) of blanks (2) is picked up from the said container (3).

6. Apparatus as in claim 3, characterised in that it includes pressing means (18) mounted on the lower part of said operating unit (5), said pressing means being adapted to be moved vertically at said release station (10), so as to press over said stack (1) of blanks (2) in synchrony with the opening of said pickup means (14), in order to tip said blanks (2) on said conveyor (6).

7. Apparatus as in claim 3, characterised in that said means for keeping said container (3) at said picking up station (9) include means (21) for stopping the advancement of said container (3) along said conveyor (6), adapted to be displaced vertically so as to protrude over the horizontal transport surface of the same conveyor (6).

8. Apparatus as in claim 3, characterised in that said means for keeping said container (3) at said picking up station (9) include a suction head (23) movable vertically under said conveyor (6), so as to grip the bottom of said container (3) when they are risen.

Patentansprüche

1. Verfahren zur automatischen Beschickung eines Förderbandes mit Stapeln von Schachtelzuschnitten, die direkt aus schalenförmigen Behältern entnommen werden, wobei jeweils ein Stapel (1) von Zuschnitten (2) durch eine senkrecht bewegliche Aufnahmevorrichtung (14) an der Aufnahmestation (9) ergriffen wird;
das Verfahren ist dadurch gekennzeichnet, daß es folgende Schritte beinhaltet:
das Aufschlitzen der vorderen Wand eines Behälters (3), der einen Stapel (1) von Zuschnitten (2) enthält;
Transfer des Zuschnittstapels (1) auf eine Ablagestation (10), an der die genannten Zuschnitte (2) hinter einer Reihe (11) bereits auf das Förderband (6) gegebener Zuschnitte abgelegt werden, während der genannte Behälter (3) an der Aufnahmestation (9) verbleibt;
die Vorwärtsbewegung einer vorderen Greifbacke (15a) der genannten Aufnahmevorrichtung (14), welche bewirkt, daß die hinter der genannten Reihe (11) auf das genannte Förderband (6) abgelegten Zuschnitte (2) leicht nach vorne gekippt werden;
das Drücken gegen den Stapel (1) von Zuschnitten (2), synchron zur Vorwärtsbewegung einer hinteren Greifbacke der genannten Aufnahmevorrichtung (14) an der Ablagestation (10), um die Kippbewegung der genannten Zuschnitte (2) zu vervollständigen;
das seitliche Wegschieben des an der Aufnahmestation (9) entleerten Behälters (3).

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß die genannte Aufnahmevorrichtung vor dem Transfer des Stapels noch weiter entlang den Seiten des genannten Stapels herunterfährt, um die Vorderwand des Behälters, der die Stapel (1) von Zuschnitten (2) enthält, aufzuschlitzen.

3. Einrichtung zur automatischen Beschickung eines Förderbandes mit Stapeln von Schachtelzuschnitten, die direkt aus entsprechenden schalenförmigen Behältern entnommen werden, enthaltend:
eine Arbeitsgruppe (5), die in Längsrichtung über einem Förderband (6) von einer Station (9), an der ein Stapel (1) von Zuschnitten (2) aus einem entsprechenden Behälter (3) entnommen wird, zu einer Station (10) bewegt werden kann, an der die genannten Zuschnitte (2) losgelassen und hinter einer Reihe (11) bereits auf das Förderband (6) beschickter Zuschnitte abgelegt wird;
eine Vorrichtung (14) mit einer vorderen (15a) und einer hinteren Greifbacke (15b) zur Aufnahme des genannten Stapels (1) von Zuschnitten (2), wobei diese Aufnahmevorrichtung von der genannten Arbeitsgruppe (5) gehalten wird und senkrecht zwischen einer unteren Stellung, in der sie den Stapel (1) von Zuschnitten (2) ergreift, und einer oberen Stellung über dem Förderband (6) hin- und herbewegt werden kann;
die Einrichtung ist dadurch gekennzeichnet, daß die genannten Greifbacken (15a, 15b) so ausgelegt sind, daß sie an der genannten Aufnahmestation (9) und Ablagestation (10) unabhängig voneinander durch entsprechende Antriebsvorrichtungen (16a, 16b) verfahren werden können, wobei die genannte vordere Greifbacke (15a) bei der Öffnung der Aufnahmevorrichtung (14) eine leichte Vorwärtsbewegung auf einer längs zum genannten Förderband (6) verlaufenden Ebene ausführt, so daß die hinter der genannten Reihe (11) abgelegten Zuschnitte (2) leicht nach vorne kippen können.

4. Einrichtung nach Anspruch 3, dadurch gekennzeichnet, daß sie außerdem umfaßt:
Vorrichtung (21, 23) zum Halten des genannten Behälters (3) an der Aufnahmestation (9);
Vorrichtung (26) zum seitlichen Wegschieben des bereits an der Aufnahmestation (9) entleerten Behälters (3).

5. Einrichtung nach Anspruch 3, dadurch gekennzeichnet, daß die Aufnahmevorrichtung (14) an der Vorderseite mit einer Schneidvorrichtung (17) versehen ist, die dazu dient, die entsprechende Wand des Behälters (3) aufzuschlitzen, während der Stapel (1) von Zuschnitten (2) aus dem Behälter (3) entnommen wird.

6. Einrichtung nach Anspruch 3, dadurch gekennzeichnet, daß sie eine Andrückvorrichtung (18) beinhaltet, die am unteren Teil der genannten Arbeitsgruppe (5) montiert ist und die an der genannten Ablagestation (10) senkrecht verfahren wird, so daß sie synchron zur Öffnung der genannten Aufnahmevorrichtung (14) von oben gegen den Stapel (1) von Zuschnitten (2) drückt, um die Zuschnitte (2) auf dem Förderband (6) zu kippen.

7. Einrichtung nach Anspruch 3, dadurch gekennzeichnet, daß die genannte Vorrichtung zum Halten des Behälters (3) an der Aufnahmestation (9) eine Vorrichtung (21) zum Stoppen der Vorwärtsbewegung des Behälters (3) auf dem Förderband (6) beinhaltet, die senkrecht so verfahren werden kann, daß sie über die horizontale Transportoberfläche des Förderbandes (6) herausragt.

8. Einrichtung nach Anspruch 3, dadurch gekennzeichnet, daß die genannte Vorrichtung zum Halten des Behälters (3) an der Aufnahmestation (9) mit einem Saugerkopf (23) ausgestattet ist, der unter dem Förderband senkrecht bewegt werden kann, so daß er in der oberen Stellung den Boden des genannten Behälters (3) ergreift.

Revendications

1. Appareil pour alimenter un convoyeur en piles de feuilles de carton, ces piles étant directement prélevés dans des conteneurs, dans lequel une pile (1) de feuilles de carton (2) est empilée par des moyens de prélèvement (14) qui se déplacent verticalement vers une station de prélèvement (9);
ledit processus étant caractérisé en ce qu'il comprend:
l'ouverture côté principal d'un conteneur (3) dans lequel une pile (1) de feuilles de carton est située;
le transfert de ladite pile (1) de feuilles de carton à une station d' évacuation (10), où lesdits feuilles de carton (2) sont placées derrière une rangée (11) de feuilles de carton précédemment amenées au convoyeur (6), et, en même temps, le maintien dudit conteneur (3) dans ladite station de prélèvement (9);
le déplacement en avant d'un dispositif à mâchoires avant (15a) dudit système de prélèvement (14), de façon à permettre auxdites feuilles de carton (2) placées derrière ladite rangée (11) sur ledit convoyeur (6) de s'incliner légèrement vers l'avant;
la pression de ladite pile (1) de feuilles de carton (2) synchronisée avec le déplacement vers l'avant d'un dispositif à mâchoires arrière dudit système de prélèvement (14) vers la station de dépôt (10), de façon à compléter l'inclinaison desdites feuilles (2);
l'écartement du conteneur (3) vidé dans la station de prélèvement (9).

2. Appareil tel qu'à la revendication 1, caractérisé en ce que ledit système de prélèvement, pour ouvrir le côté principal du conteneur contenant la pile (1) de feuilles (2) est déplacé vers le bas le long des côtés de ladite pile avant le transfert de cette dernière.

3. Appareil pour alimenter automatiquement un convoyeur en piles de feuilles de carton, ces piles étant directement prélevées dans un conteneur, ledit appareil comprenant:
une unité d'entraînement (5) se déplacant longitudinalement sur un convoyeur (6) d'une station (9), où une pile (1) de feuilles (2) est prélevée dans un conteneur (3), à une station (10) où lesdites feuilles (2) sont déposées derrière une rangée (11) de feuilles précédemment amenées audit convoyeur (6);
un système (14) doté de mâchoires (15a, 15b), mâchoire avant et mâchoire arrière respectivement, destiné à prélever ladite pile (1) de feuilles (2), ledit système de prélèvement étant porté par ladite unité d'entraînement (5) et se déplacant verticalement entre une position abaissée, dans lequel il prélève une pile (1) de feuilles (2) et une position soulevée au-dessus du convoyeur (6);
L'appareil est caractérisé en ce que lesdites mâchoires (15a, 15b) sont conçues pour pouvoir se déplacer indépendamment l'une de l'autre, par un actionneur respectif (16a, 16b), quand elles se trouvent à ladite station de prélèvement (9) et à ladite station de dépt (10), ladite mâchoire avant (15a) étant étudiée pour se déplacer légèrement en avant, quand ledit dispositif de prélèvement (14) s'ouvre, sur un plan de la longueur dudit convoyeur (6), de façon à permettre auxdites feuilles (2) placées derrière ladite rangée (11) de s'incliner légèrement.

4. Un appareil selon la revendication 3, caractérisé en ce qu'il comprend également:
un dispositif (21, 23) destiné à maintenir ledit conteneur (3) dans ladite station de prélèvement (9);
un dispositif (26) destiné à écarter un conteneur (3) déjà vidé dans ladite station de prélèvement (9);

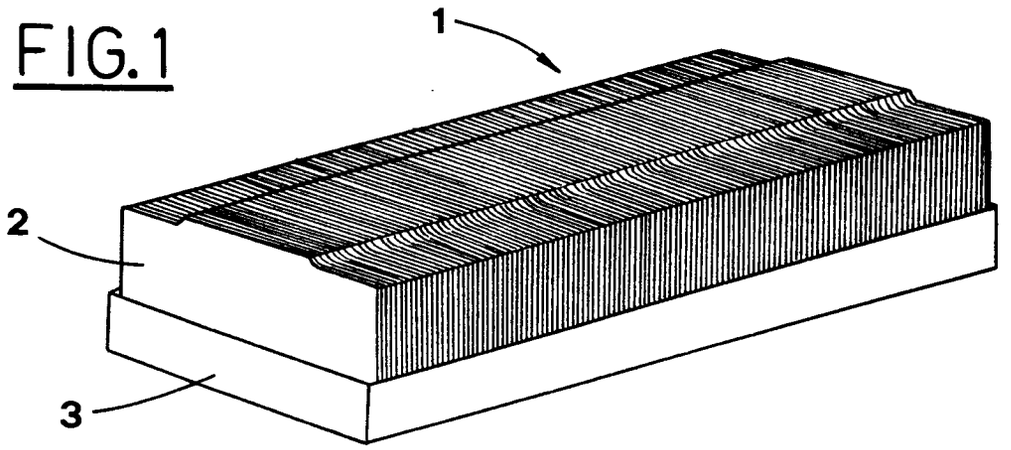
5. Un appareil selon la revendication 3, caractérisé en ce que ledit dispositif de prélèvement (14) est équipé dans la partie avant d'un dispositif de coupe (17) destiné à ouvrir le côté correspondant dudit conteneur (3) quand une pile (1) de feuilles (3) est prélevée dans ledit conteneur (3).

6. Un appareil selon la revendication 3, caractérisé en ce qu'il comprend un dispositif de pression (18) monté sur la partie inférieure de ladite unité d' entraînement (5), ledit dispositif de pression étant destiné à se déplacer verticalement dans ladite station de dépôt (10), de façon à comprimer par le haut ladite pile (1) de feuilles (2), selon un mouvement synchronisé avec l'ouverture dudit dispositif de prélèvement (14), de façon à incliner lesdites feuilles (2) sur ledit convoyeur (6).

7. Un appareil selon la revendication 3, caractérisé en ce que ledit dispositif destiné à maintenir ledit conteneur (3) dans ladite station de prélèvement (9) comprend un dispositif (21) d'arrêt de l'avancement dudit conteneur (3) le long dudit convoyeur (6), destiné à se déplacer verticalement de façon à dépasser au dessus de la surface de transport horizontale dudit convoyeur (6).

8. Un appareil selon la revendication 3, caractérisé en ce que ledit dispositif destiné à maintenir ledit conteneur (3) dans ladite station de prélèvement (9) comprend un tête de succion (23) se déplacant verticalement sous ledit convoyeur (6), de façon à saisir le fond dudit conteneur (3) quand il est soulevé.

FIG.1



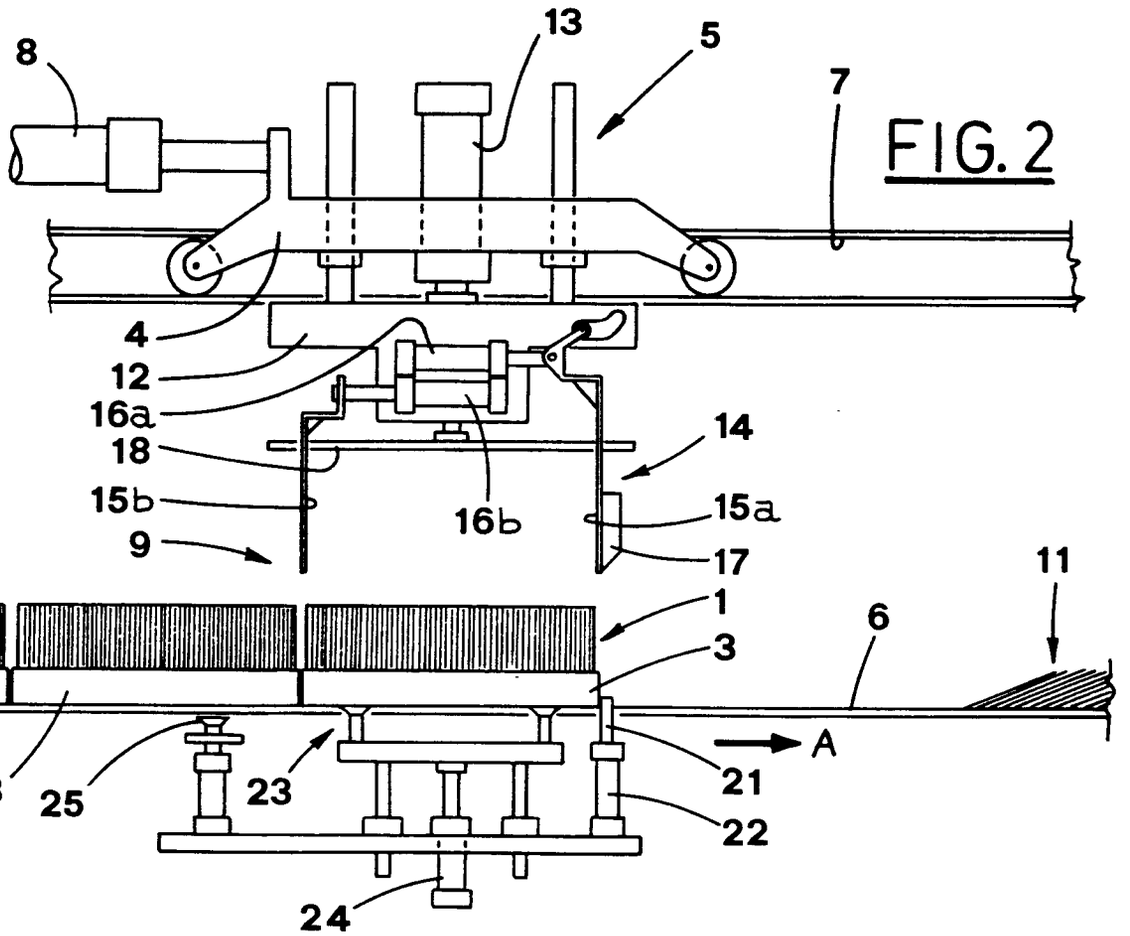


FIG.2

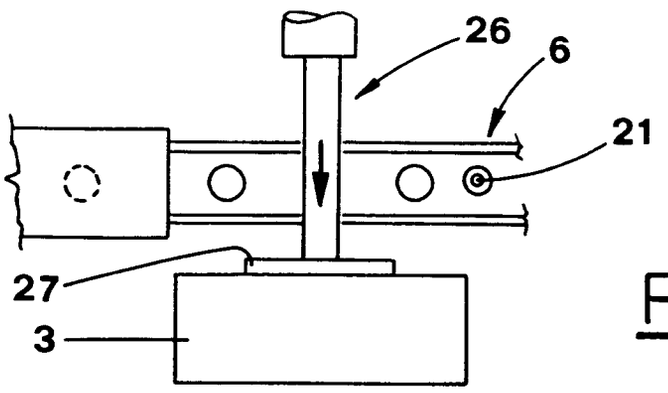


FIG.10

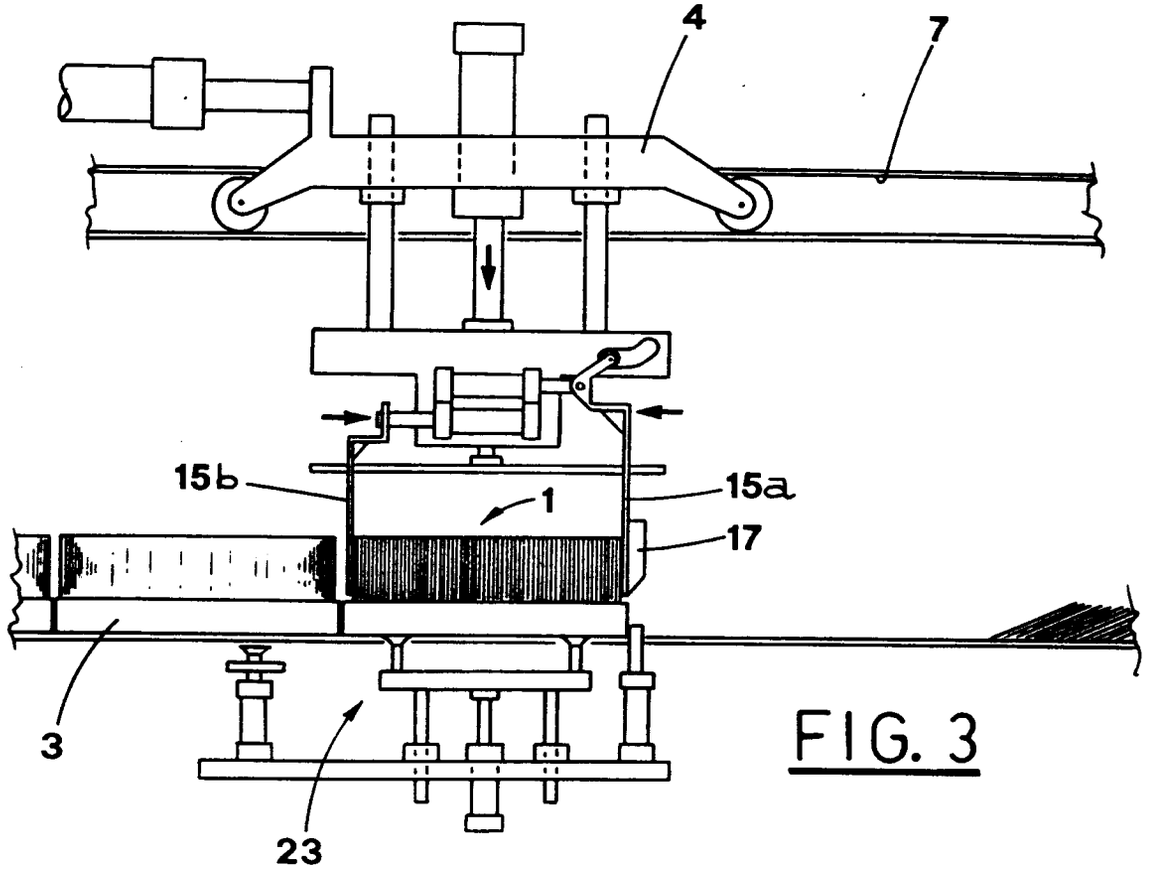


FIG. 3

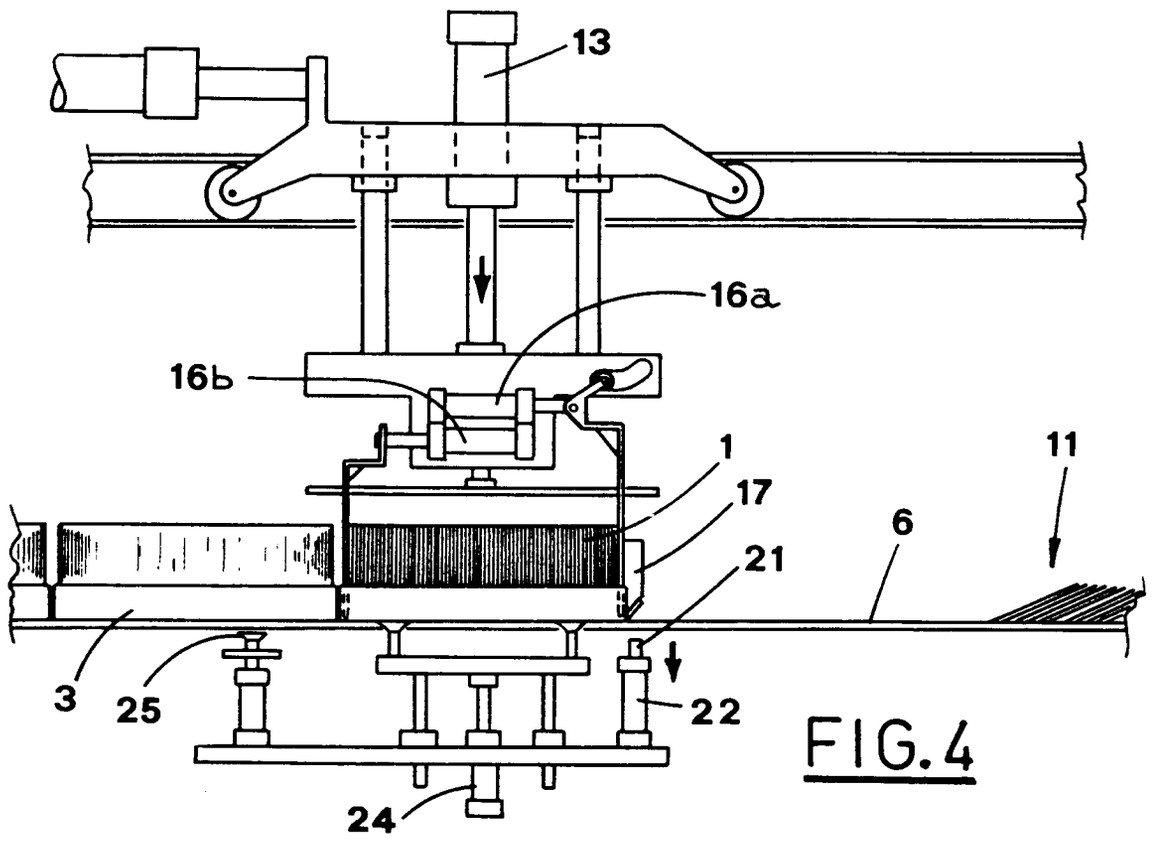


FIG. 4

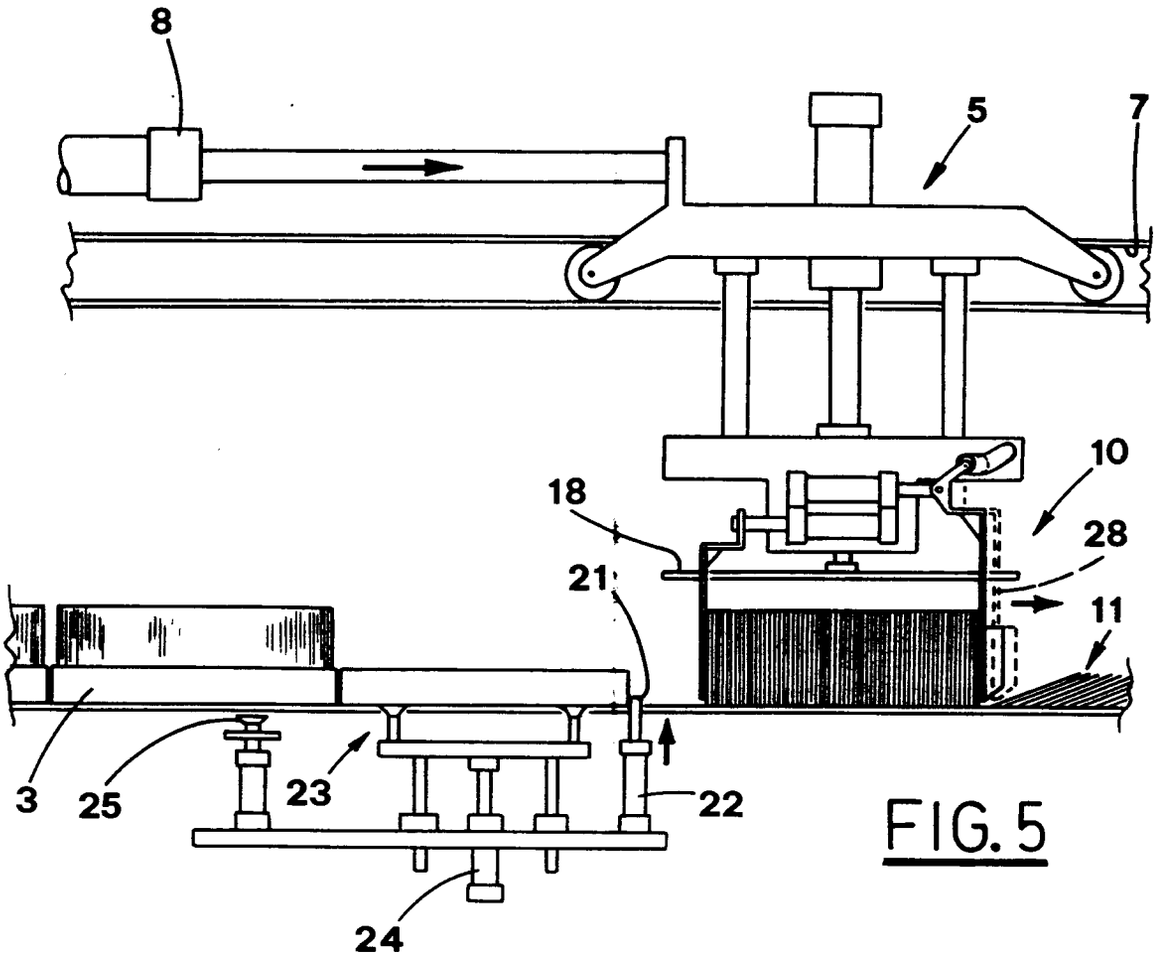


FIG. 5

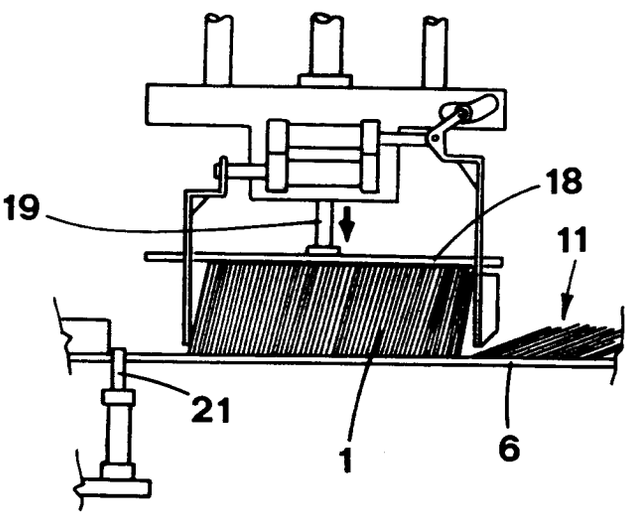


FIG. 6

FIG. 7

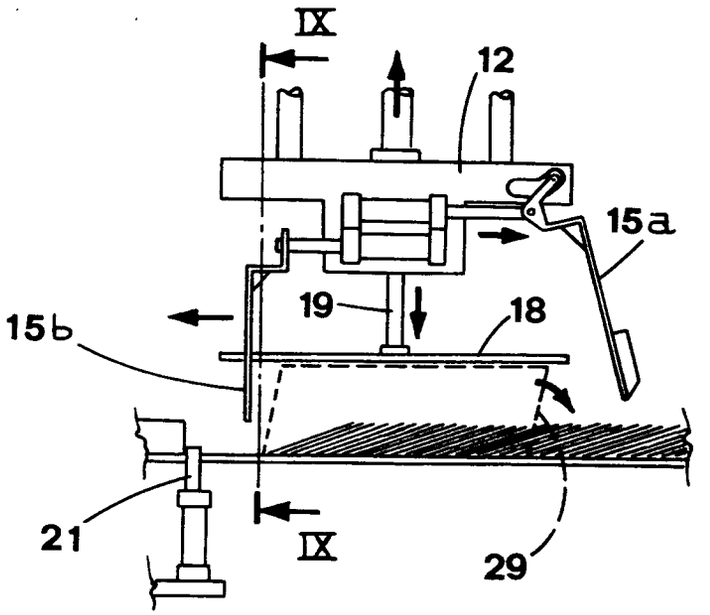
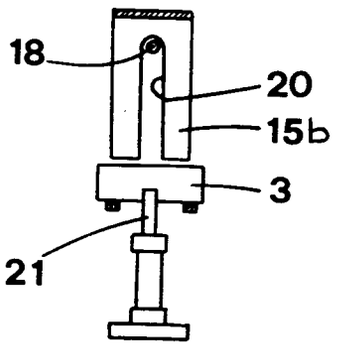


FIG. 9



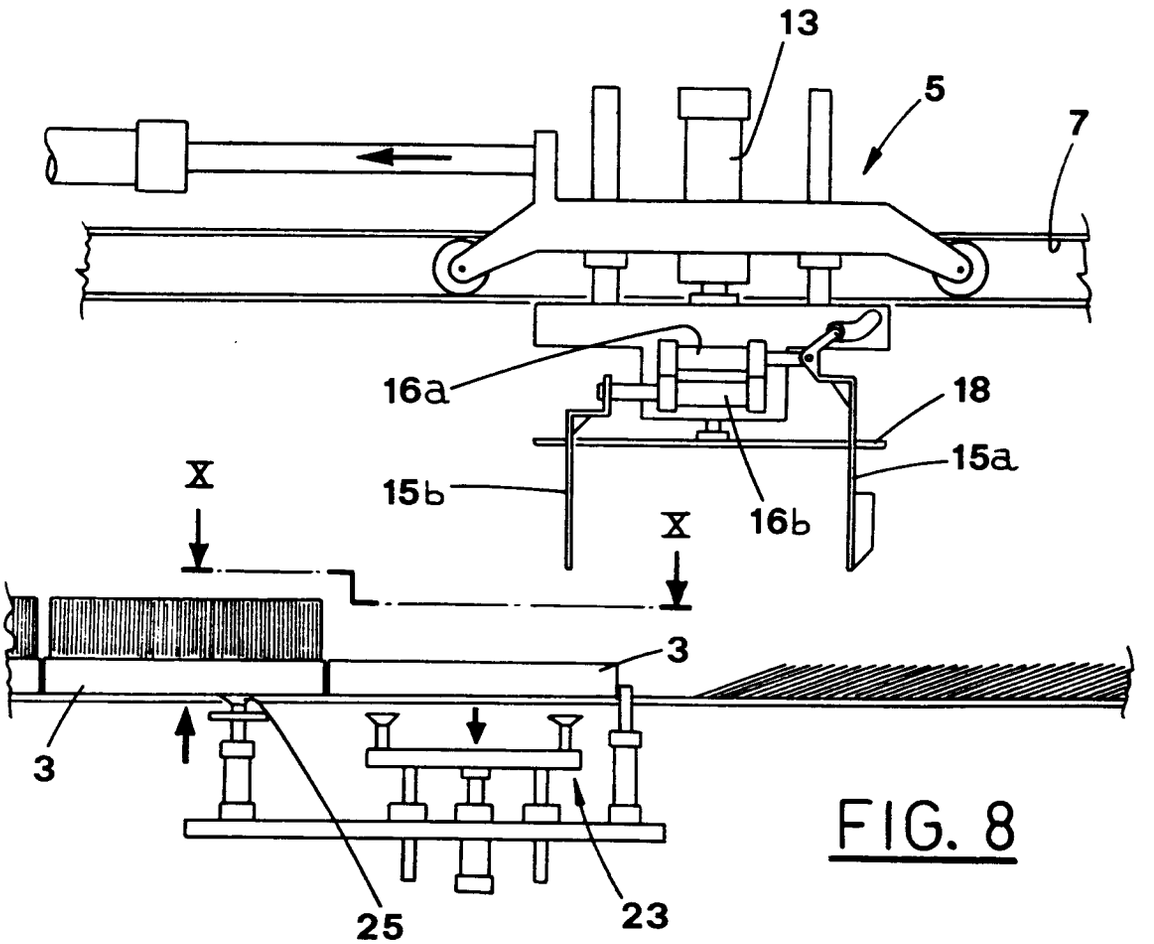


FIG. 8