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(71) Applicant : **MARCHESINI GROUP S.p.A.**
Via Garganelli, 20
I-40065 Pian di Macina Pianoro (Bologna) (IT)

(72) Inventor : **Marchesini, Massimo**
Via San Bartolomeo 17
I-40065 Pianoro (Bologna) (IT)

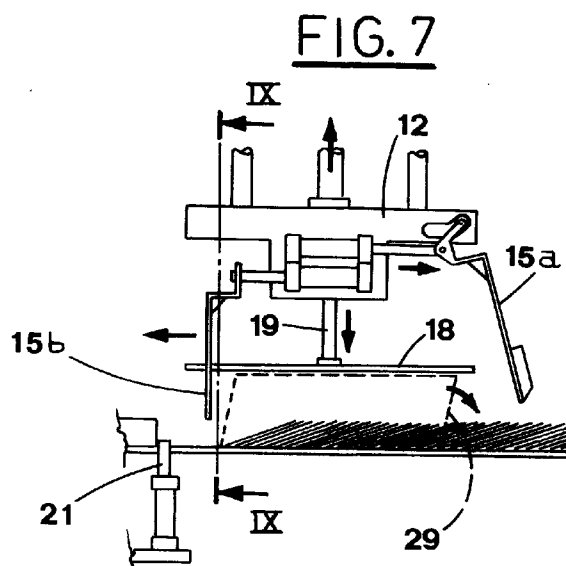
(74) Representative : **Dall'Olio, Giancarlo**
INVENTION s.n.c. Via Arienti 26
I-40124 Bologna (IT)

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

(57) The process for automatically feeding a conveyor (6) with stacks (1) of blanks (2) taken directly from respective bowl containers (3) includes clamping a stack (1) of blanks (2) by pickup means (14), at a picking up station (9).

After having ripped the leading wall of the container (3), the stack (1) is transferred to a station (10) where the blanks (2) are released behind a row (11) of blanks previously fed to the conveyor, while the container (3) is kept at the picking up station (9). At the release station (10) the front jaw (15a) of the pickup means (14) is moved forward so as to allow the blanks to partially slant forward, and then a pressure is applied on the stack (1) of blanks (2) in synchrony with the pickup means (14) being opened, so as to complete the tipping of the blanks (2).

At the picking-up station (9) the container (3) already emptied is lastly pushed aside.



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.

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 forwardly 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 transporting 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 transferred 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, previously 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 previously 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 conveyor 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 transferring 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, the said process being characterized in that it includes:
clamping a stack (1) of blanks (2) by pickup means (14) that are vertically movable at a picking up station (9);
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 for automatically feeding a conveyor with stacks of blanks, these stacks being directly taken out from bowl containers, the said process being characterized in that it includes:
gripping a stack (1) of blanks (2) by pickup means (14) that are vertically movable at a picking up station (9);
compressing said stack by said pickup means;
moving said pickup means downwardly along the sides of said stack until the leading wall of the container holding the stack (1) of blanks (2) is ripped;
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).

3) Apparatus for automatically feeding a conveyor with stacks of blanks, these stacks being directly taken out from related bowl containers, the said apparatus being characterized in that it includes:

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) 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);
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).

4) Apparatus as in claim 3, characterized in that said pickup means (14) include jaws (15a, 15b), front jaw and rear jaw respectively, 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).

5) Apparatus as in claim 4, characterized in that said front jaw (15a) is adapted 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.

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

7) Apparatus as in claim 3, characterized 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).

8) Apparatus as in claim 3, characterized 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).

9) Apparatus as in claim 3, characterized 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.

FIG.1

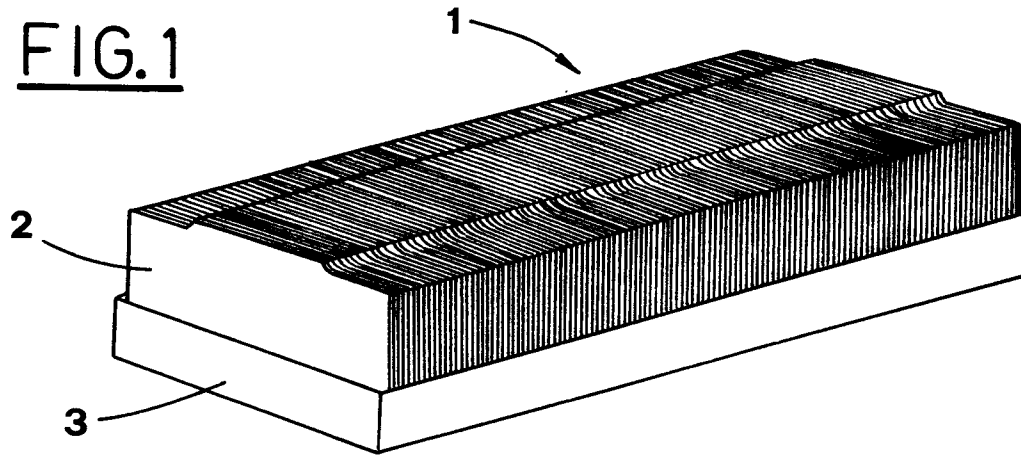


FIG.2

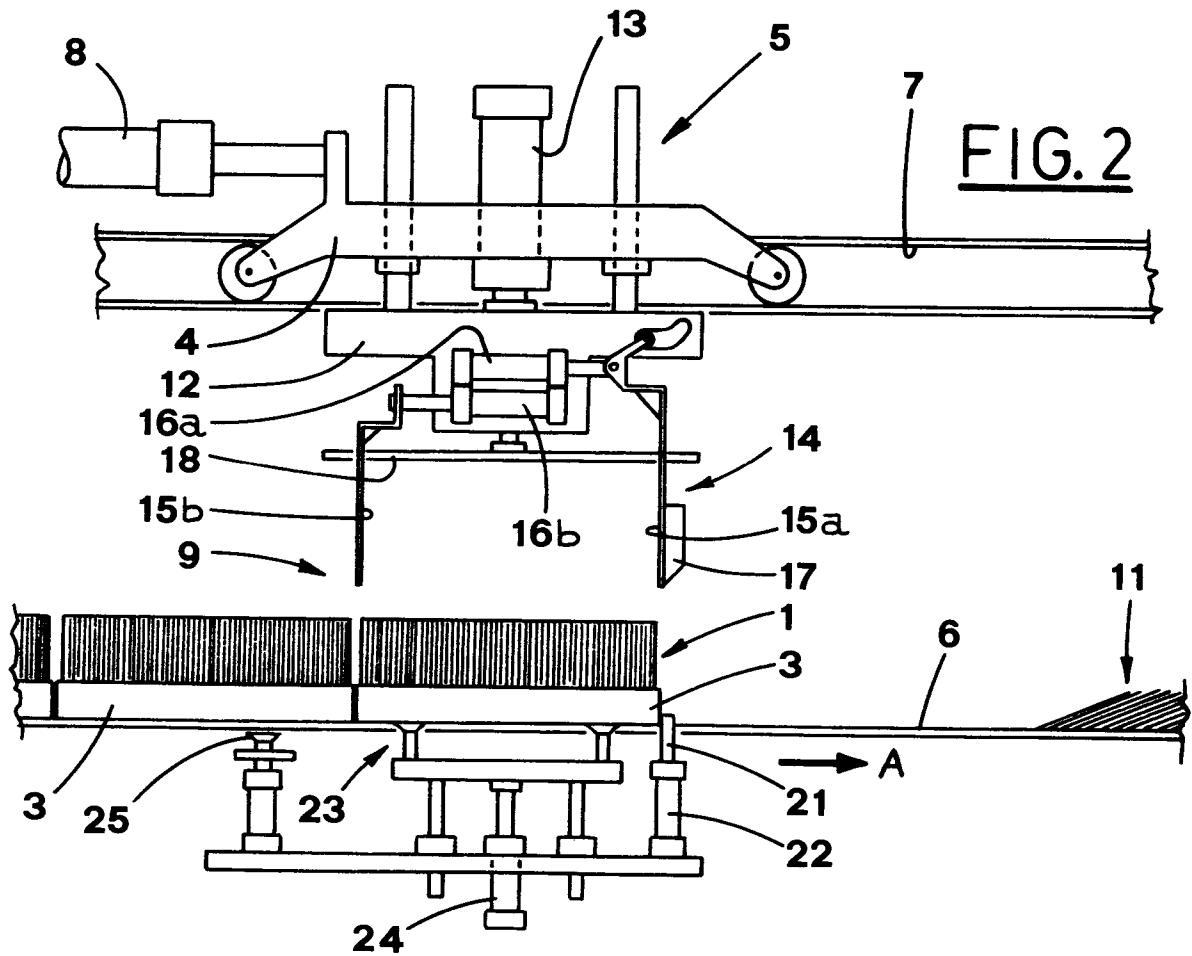
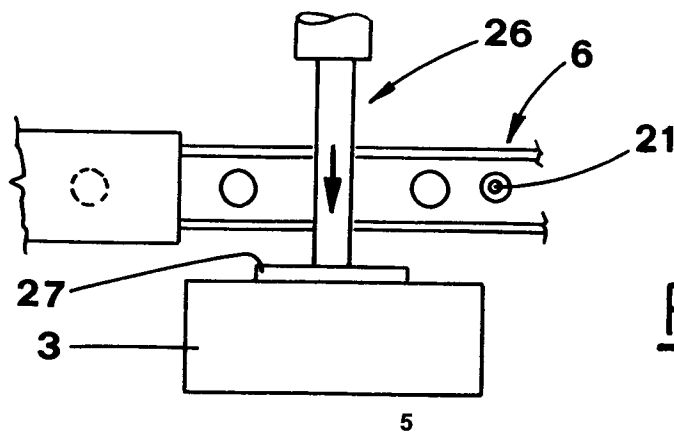
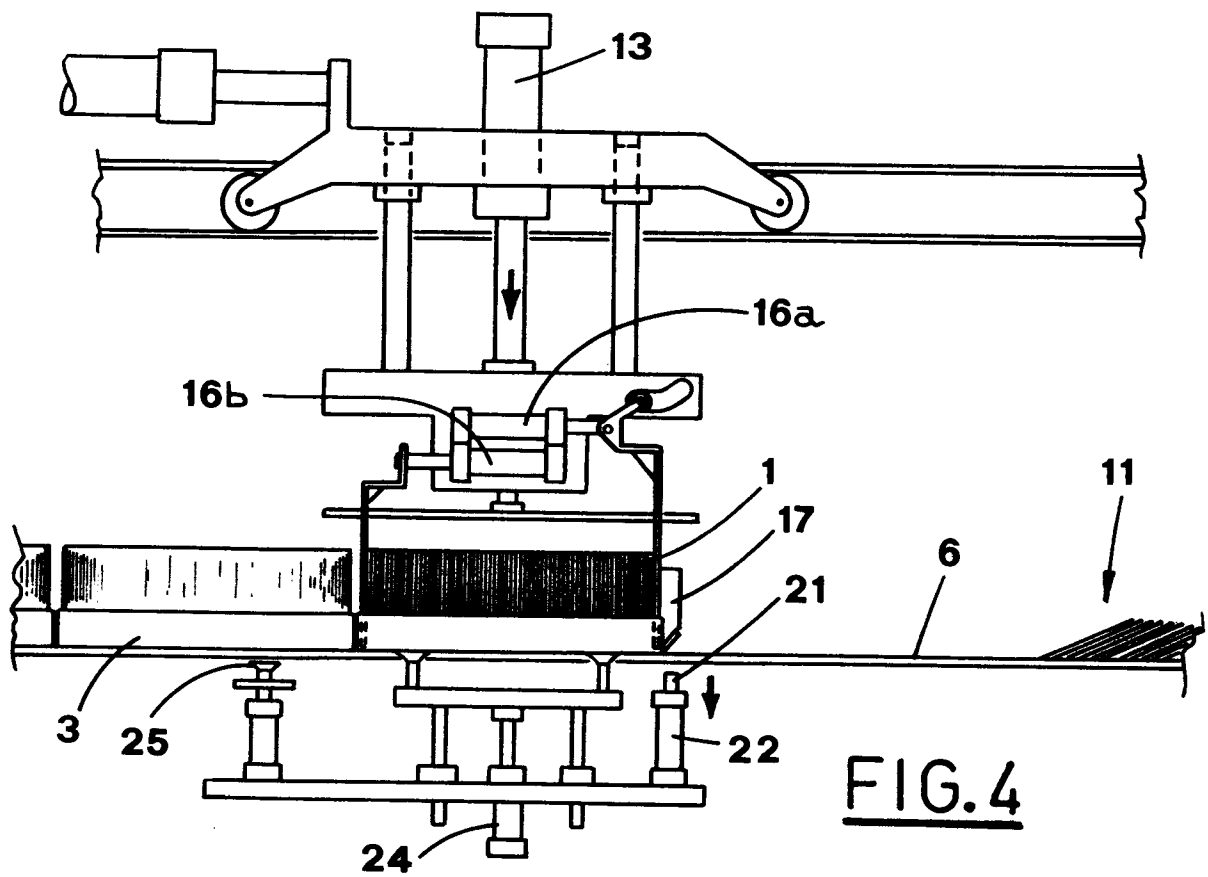
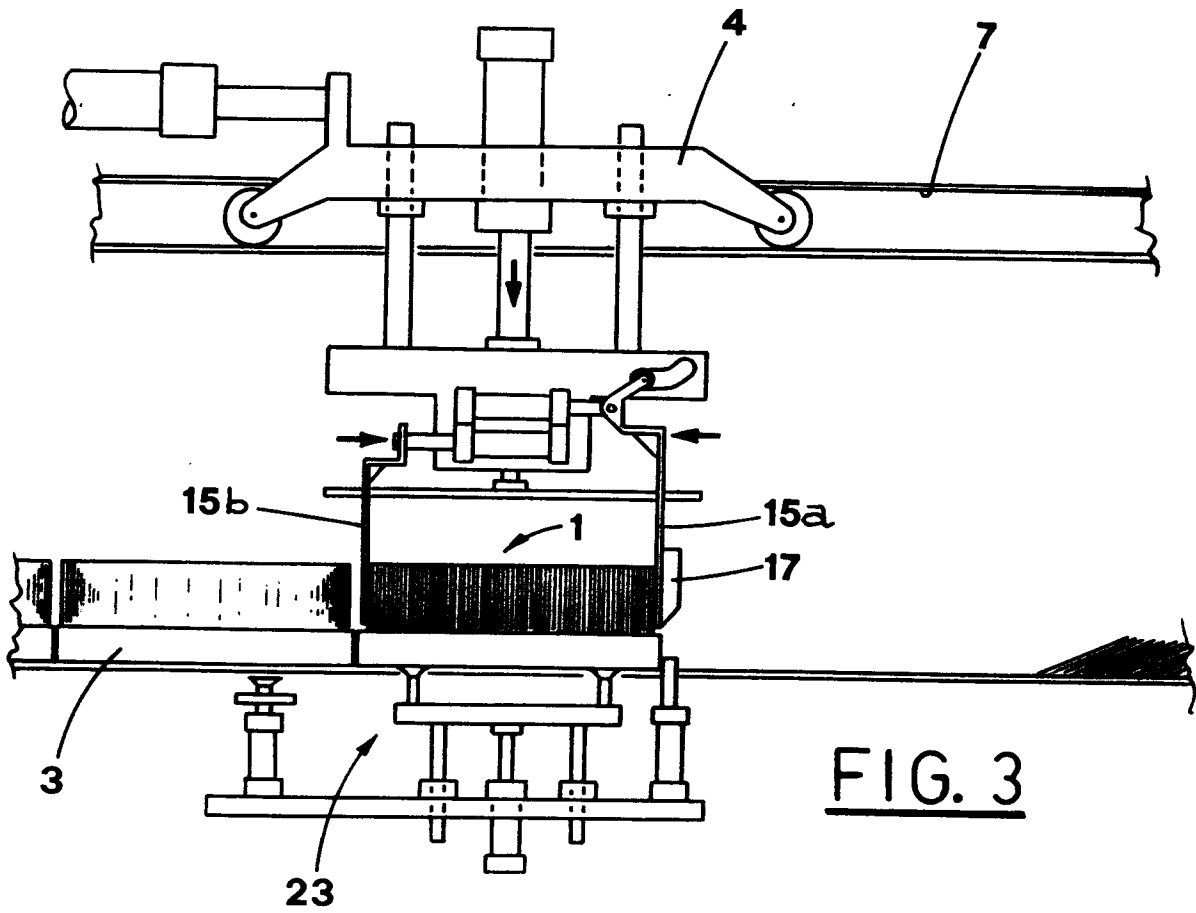


FIG.10





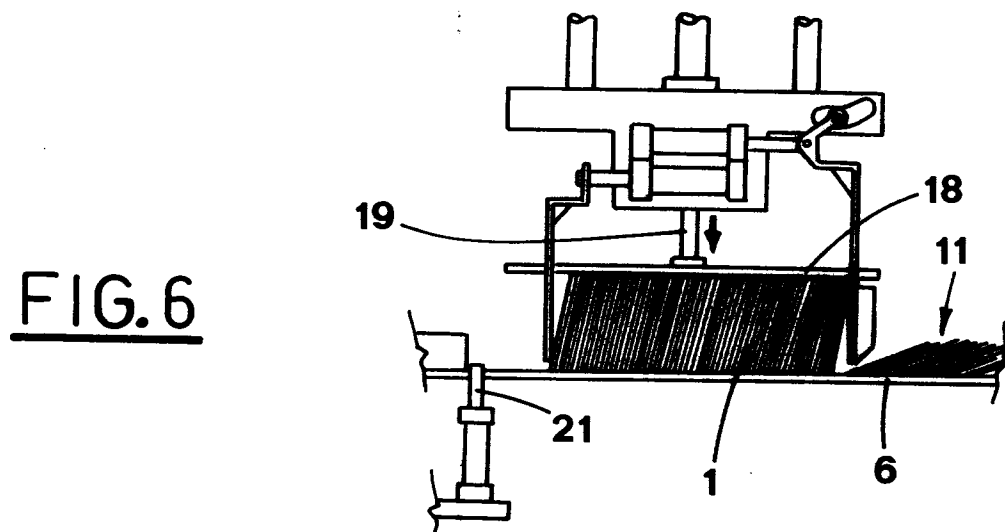
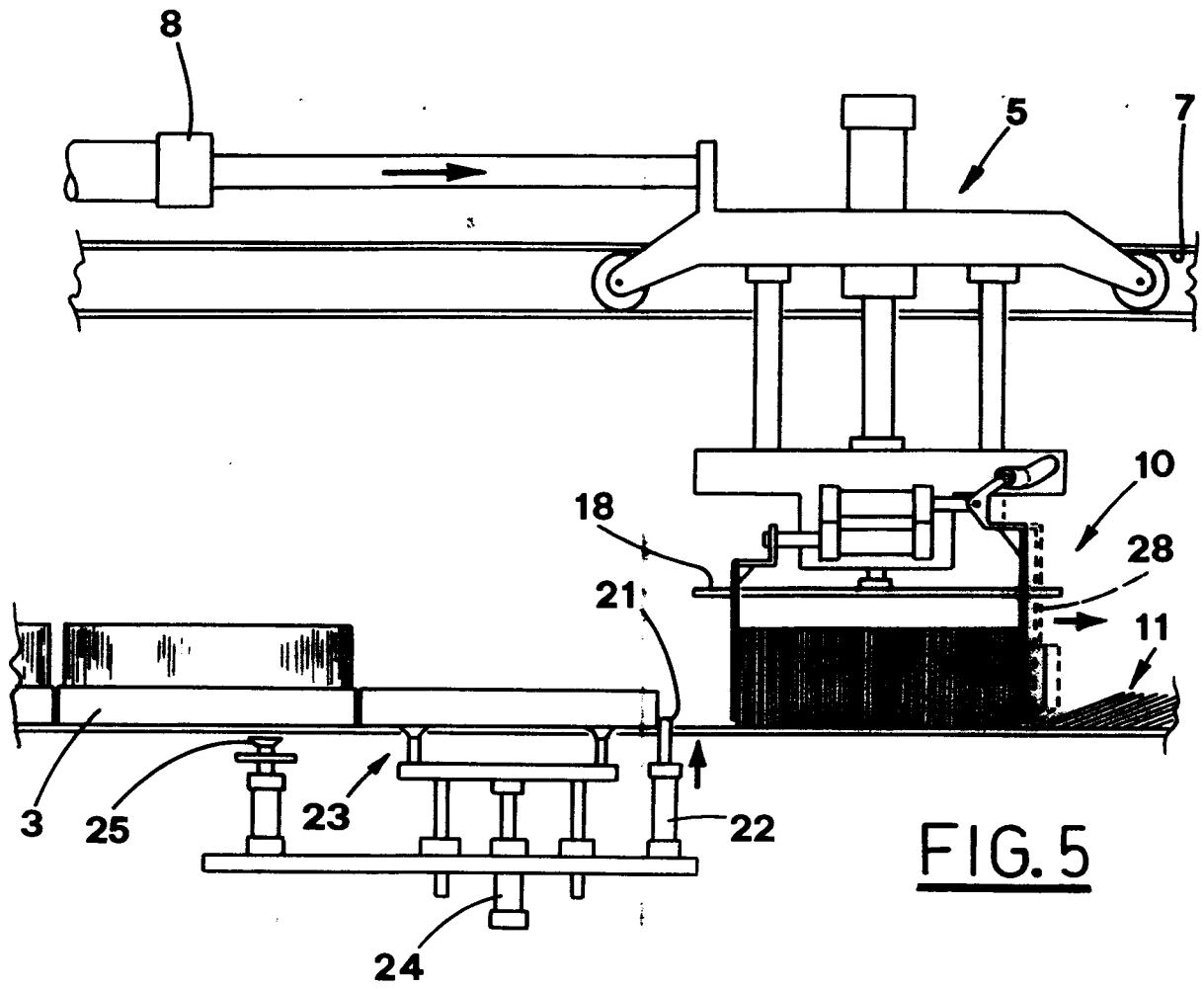


FIG. 7

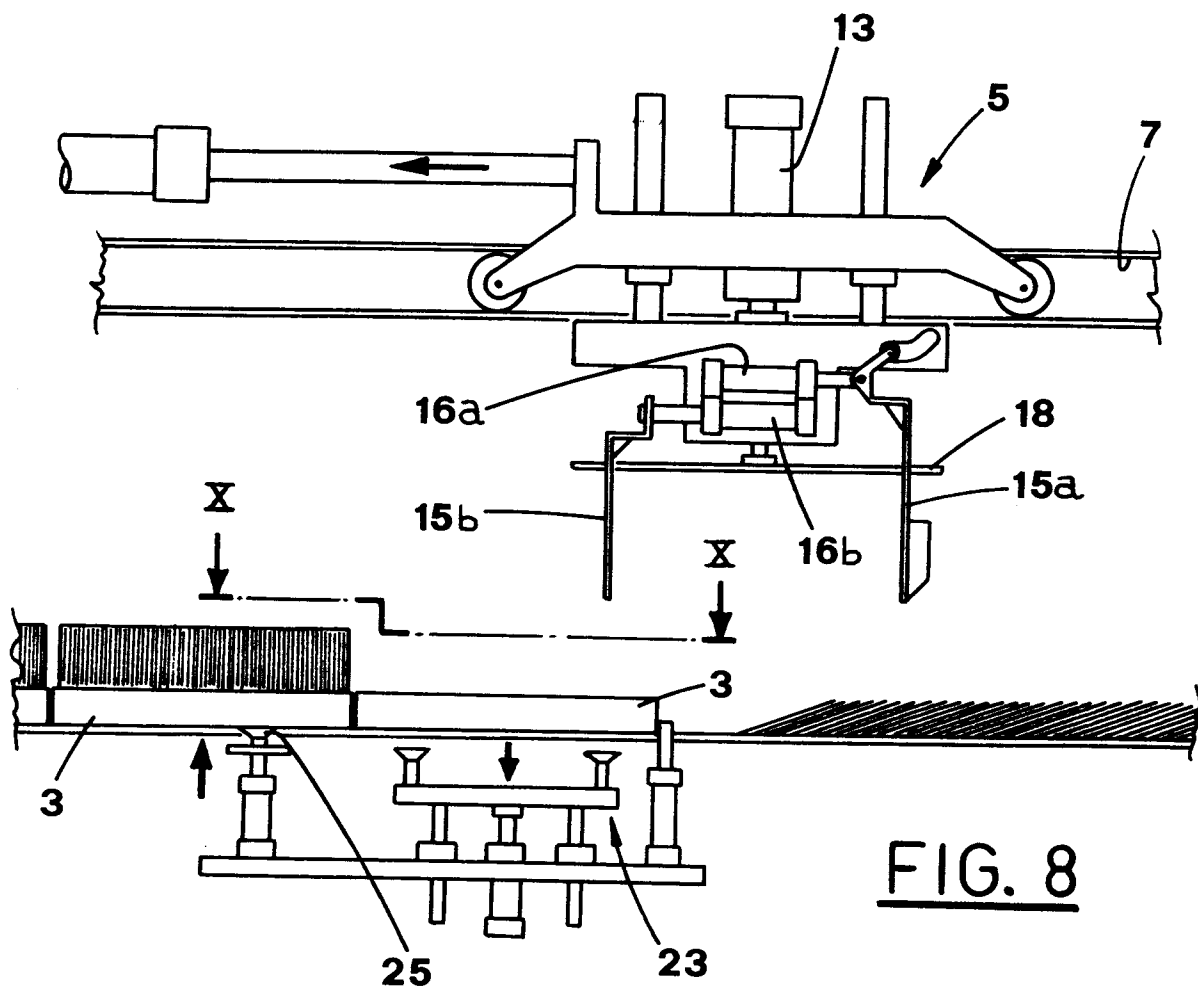
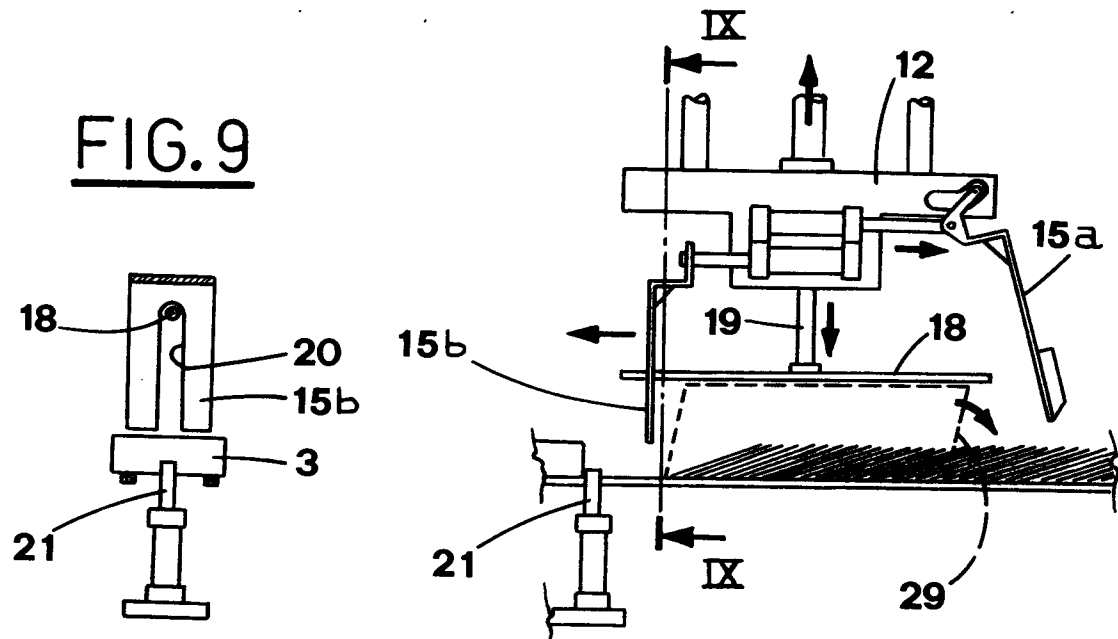


FIG. 8



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 83 0410

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	US-A-4 635 428 (FUJI PHOTO FILM CO.) * column 2, line 65 - column 3, line 15; figure 1 * -----	1	B65H1/30 B65B69/00
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B65H B65B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 18 NOVEMBER 1992	Examiner LONCKE J.W.
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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