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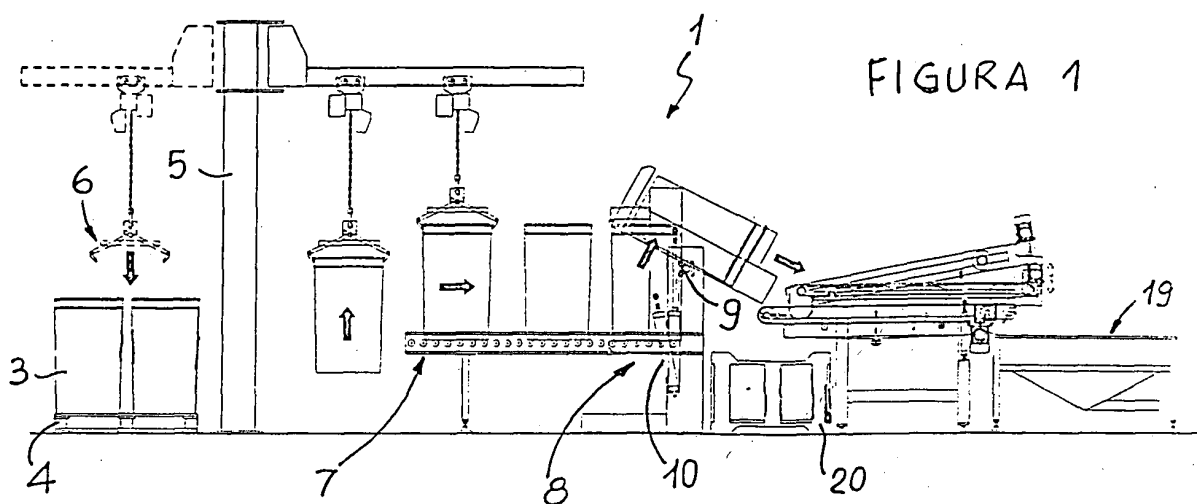
(54) **A method and apparatus for emptying bags containing food products in the liquid or paste-like state**

(57) A method for emptying bags of food products comprises the steps of:

- advancing the bag on substantially horizontal motorised conveyor to an area where is present a cutting device and a hopper for collecting the product contained in the bag;
- cutting the bag;
- squeezing the bag positioned horizontally on the conveyor, by sliding presser rollers in the direction of advance of the bag.

The apparatus for emptying the bags (2) comprises:

- a substantially horizontal conveyor (11) whereon each bag is fed in substantially lying position to convey it towards a cutting device;
- a collecting hopper (19), positioned in correspondence with the cutting device, so shaped as to receive the product exiting the bag (2) after the bag is cut;
- presser means (17) so shaped as to squeeze the bag (2) acting in the direction of advance thereof towards the hopper.



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Description

[0001] The present invention relates to a method and an apparatus for emptying bags containing food products in the liquid or paste-like state.

[0002] The document IT 1180852 discloses an apparatus for emptying flexible bags containing food products, in which a pincer is used to grab the upper part of the bag, extracting the bag from a rigid containment barrel.

[0003] The pincer extracts the bag when said bag is vertically housed in the barrel, or after the barrel has been inclined to favour the exit of the bag therefrom and the positioning of the bag in a substantially horizontal lay.

[0004] The bag is carried by the pincer into a hopper where a device for cutting the bag is present, and it is positioned vertically into the hopper so that the mouth of the bag, held from above by the pincer, passes between a pair of squeezing rollers. While the pincer lifts the bag, the rollers squeeze the bag, starting from the area of the mouth and through to the cut bottom of the bag, favouring the descent of the product into the hopper.

[0005] However, this solution is rather complex because it requires an operator to insert the upper part of the bag between the jaws of the pincer and an accurate adjustment of the squeezing rollers is necessary.

[0006] Moreover, the pincer must be associated to a strong support structure as it has to lift bags of considerable weight.

[0007] An object of the present invention is to eliminate the aforesaid drawbacks making available a simplified method and apparatus for emptying the flexible bags normally used in the food industry for containing products in the liquid or paste-like state, and to eliminate the sanitary problems due to the presence of the bag directly on the hopper for unloading the product.

[0008] A further object is not to raise the bag, handling it with mechanical means in substantially horizontal position.

[0009] Said objects are fully achieved by the method and by the apparatus of the present invention, which are characterised by the content of the appended claims and in particular in that the method comprises:

- advancing the bag on substantially horizontal motorised conveyor to an area where is present a cutting device and a hopper for collecting the product contained in the bag;
- cutting the bag;
- squeezing the bag positioned horizontally on the conveyor.

[0010] The squeezing operation preferably occurs by sliding presser rollers in the direction of advance of the bag and, when the squeezing operation is nearly complete, the conveyor may be actuated in the opposite di-

rection relative to the direction of advance, whilst the area of the mouth is held motionless, in order to enable a more complete squeezing of the area of the bag at the sides of the mouth.

[0011] The apparatus comprises:

- a substantially horizontal conveyor whereon each bag is fed in substantially lying position to convey it towards a cutting device;
- a collecting hopper, positioned in correspondence with the cutting device, so shaped as to receive the product exiting the bag after the bag is cut;
- presser means so shaped as to squeeze the bag acting in the direction of advance thereof towards the hopper.

[0012] This and other feature shall become more readily apparent from the following description of a preferred embodiment illustrated, purely by way of non limiting example, in the accompanying drawing tables, in which:

- Figures 1 and 2 globally illustrate a lateral and plan view of the installation;
- Figures 3 through 11 illustrate a lateral view of the apparatus in successive operating phases;
- Figure 12 shows a plan view of the apparatus in the phase of Figure 9;
- Figures 13 through 19 illustrate a lateral view of the apparatus in successive operating phases according to an embodiment variant;
- Figure 20 shows the cutting device.

[0013] With reference to the figures, the number 1 globally designates an installation for emptying bags 2 containing food products in the liquid or paste-like state (for example juices or purees of fruit or vegetables) and housed in rigid barrels 3 positioned on pallets 4.

[0014] A structure 5 (in the specific case an electric hoist) provided with grip means 6 raises and transports the barrels 3 on a roller set 7, the lid (not shown) of the barrel is removed manually, the barrel then advances to an upsetting device 8 substantially constituted by an "L" shaped structure rotating about a pivot 9 when it is actuated by a pneumatic cylinder 10.

[0015] When the barrel, as a result of the action of the upsetting device, has its mouth oriented downwards, the bag contained therein automatically exits onto a conveyor 11, preferably of the belt type, provided with a motorisation 12 (Figure 3 and 13).

[0016] The bag then continues its travel to an exit area of the conveyor 11 (Figures 4 and 14).

[0017] According to a first embodiment, a movable frame 13 is used, hinged to an end thereof and provided with an actuator, in the specific case a pneumatic cylinder 14, to cause the raising/lowering of the other end.

[0018] The movable frame 13 is provided with a chain 15 actuated by a motorisation 16 to cause the translation

of a roller 17 from a rest position, shown in Figures 3 and 4, to an operative position shown in the following figures.

[0019] In particular the frame remains raised in the initial phase of introduction of the bag on the conveyor 11 not to hamper the positioning of the bag on the conveyor, and it is subsequently lowered (Figure 6) to allow the roller 17, which constitutes a crushing and squeezing means, to advance until it presses on the bag 2 placing its content substantially under pressure (Figure 7) before proceeding to cut the bag itself, so that the cut is performed in more favourable conditions.

[0020] After the cutting step, the squeezing of the bag is started (Figure 8) until the roller 17 arrives against a mouth 18 for filling the bag (Figure 9).

[0021] At this point the conveyor 11 is actuated in the opposite direction to the direction of advance of the bag. Since the roller 17 in fact is subdivided into three rollers mounted idle on the same axis, when the conveyor moves in the direction opposite to the direction of advance of the bag, the central roller keeps the mouth 18 motionless whilst the lateral rollers rotate by underlying friction allowing the bag to fold (Figures 9 and 12) to favour its emptying into a collecting hopper 19.

[0022] At the end of the emptying operation the frame is raised again (Figure 10) to allow the unloading of the bag towards a container 20 for the collection of the emptied bags (Figure 11).

[0023] With reference to the embodiment variant shown in Figures 13 through 19, instead of the movable frame 13 there is a fixed frame, also provided with motorised chain for actuating a presser roller that is preferably subdivided into three distinct rollers rotating idle on a same axis. Preferably, the fixed frame has a greater length than the conveyor 11, in order to allow the roller 17, when it is in the resting position (Figure 13), not to interfere with the laying of the bag on the conveyor.

[0024] The bag then proceeds towards the cutting area (Figure 14), is put under pressure by the roller (Figure 15), is cut and pressed (Figure 16), the squeezing operation is completed (Figure 17) also with the aid of the actuation of the conveyor in the opposite direction to the direction of advance of the bag, the roller is then moved backwards upstream of the conveyor (Figure 18) to allow the unloading of the bag (Figure 19) as in the solution described above.

[0025] With reference to Figure 20, a blade 21 with automatic actuation is introduced into the bag under pressure, causing its cut and the subsequent exit of the product.

[0026] The present invention originally allows to cut and squeeze the bags when they lie horizontally, effecting the cut in the area of the bag from the side of the mouth, with no need to use complex pinching means to hold the bag.

[0027] Moreover, the original step of placing the bag under pressure, by acting on the roller 17, before effecting the cut, allows to cut the bag in more favourable con-

ditions than in the prior art.

[0028] The squeezing operation is considerably improved as well, as a consequence of the adoption of the multiple roller 17, constituting presser and squeezing means, subdivided into three coaxial, mutually independent portions.

Claims

1. A method for emptying bags containing food products in the liquid or paste-like state, of the type which may comprise a preliminary step of removing the lid of a barrel in which the bags are contained and of positioning the opened barrel on an upsetting device in such a way as to cause the bag to slide outside the barrel onto a substantially horizontal transport plane.

characterised in that it comprises the following steps:

- advancing the bag on substantially horizontal motorised conveyor to an area where is present a cutting device and a hopper for collecting the product contained in the bag;
- cutting the bag;
- squeezing the bag positioned horizontally on the conveyor.

2. A method as claimed in claim 1, wherein the squeezing operation takes place by sliding presser rollers in the direction of advance of the bag.

3. A method as claimed in claim 1, wherein once the squeezing operation is nearly completed the conveyor is actuated in the opposite direction to the direction of advance, whilst the area of the mouth is held motionless, in order to allow a more complete squeezing of the lateral areas.

4. A method as claimed in claim 1, wherein before the step of cutting the bag, the bag is put under pressure by means for squeezing the bag.

5. An apparatus for emptying bags (2) containing food products in the liquid or paste-like state, **characterised in that** it comprises:

- a substantially horizontal conveyor (11) whereon each bag is fed in substantially lying position to convey it towards a cutting device;
- a collecting hopper (19), positioned in correspondence with the cutting device, so shaped as to receive the product exiting the bag (2) after the bag is cut;
- presser means (17) so shaped as to squeeze the bag (2) acting in the direction of advance thereof towards the hopper.

6. An apparatus as claimed in claim 5, wherein the conveyor (11) is of the belt type, actuated by a motorisation (12).
7. An apparatus as claimed in claim 5, wherein the presser means comprise at least a roller (17) mounted idle on an axis whose ends are secured to a motorised chain (15). 5
8. An apparatus as claimed in claim 7, wherein the roller (17) and the chain (15) are associated to a movable frame (13), hinged at an end and having the other end which can be raised or lowered by means of an actuator (14). 10
9. An apparatus as claimed in claim 7, wherein the roller (17) and the chain (15) are associated to a fixed frame, superposed on the conveyor (11). 15
10. An apparatus as claimed in claim 7, wherein the roller (17) is subdivided into independent portions or rollers rotating idle on a same axis. 20
11. An apparatus as claimed in claim 5, comprising a container (20) for collecting the emptied bags (2), which receive the emptied bags coming directly from the conveyor (11) when the conveyor is actuated in the opposite direction to the direction of advance of the bags towards the cutting area. 25
12. An apparatus as claimed in claim 5, wherein the cutting device comprises a blade which, actuated by automatic actuator means, is introduced into the bag causing it to be cut cleanly. 30

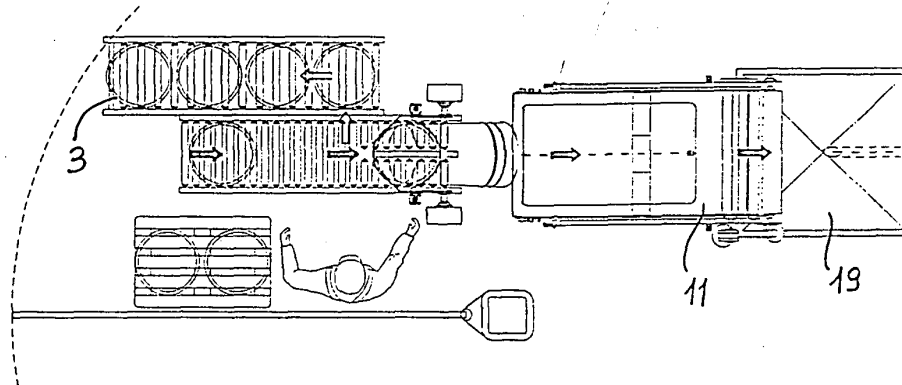
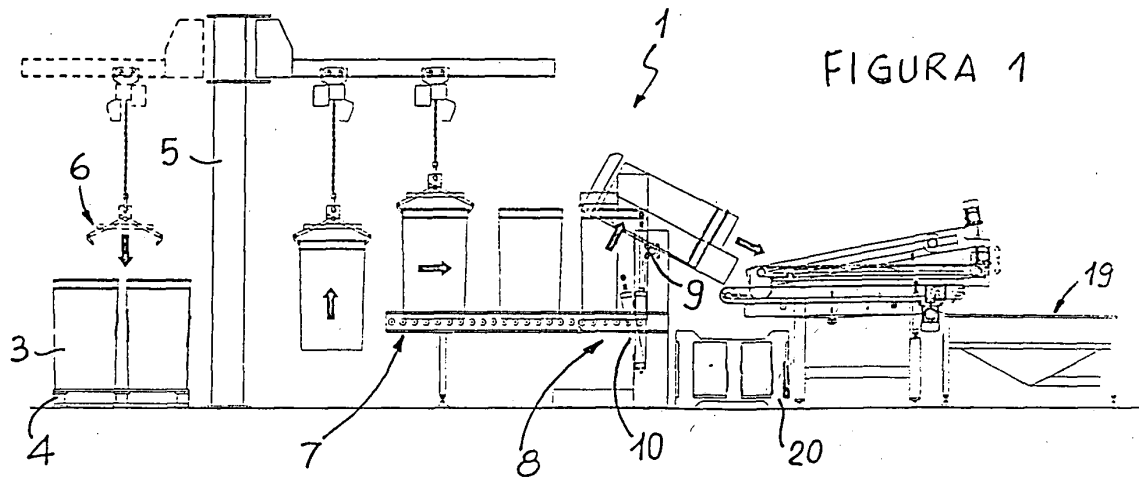
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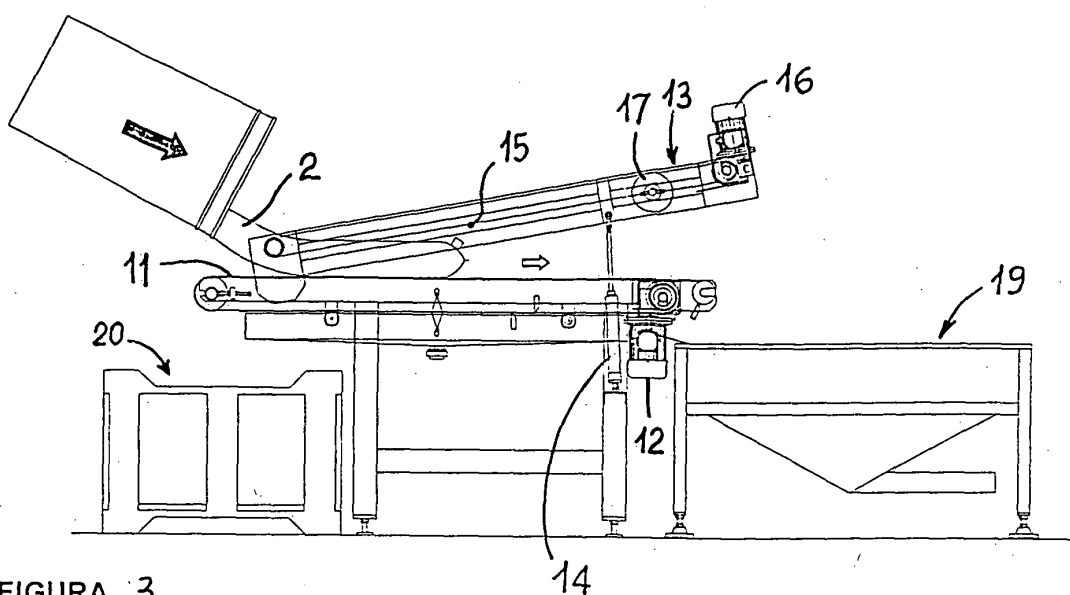


FIGURA 3

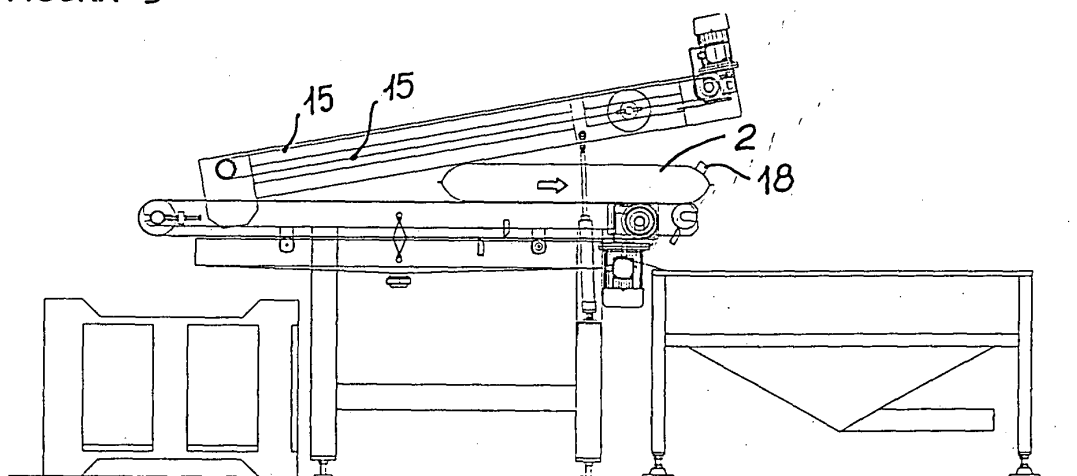


FIGURA 4

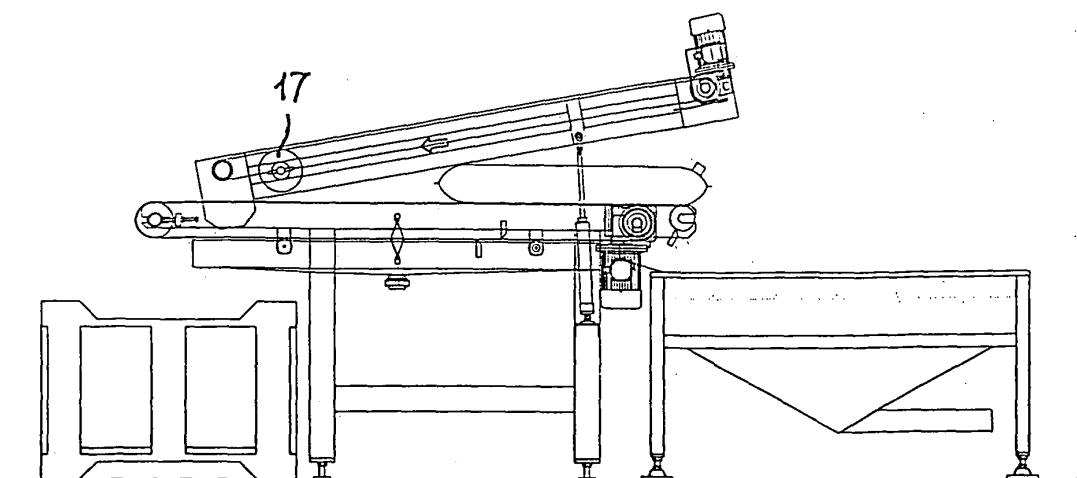


FIGURA 5

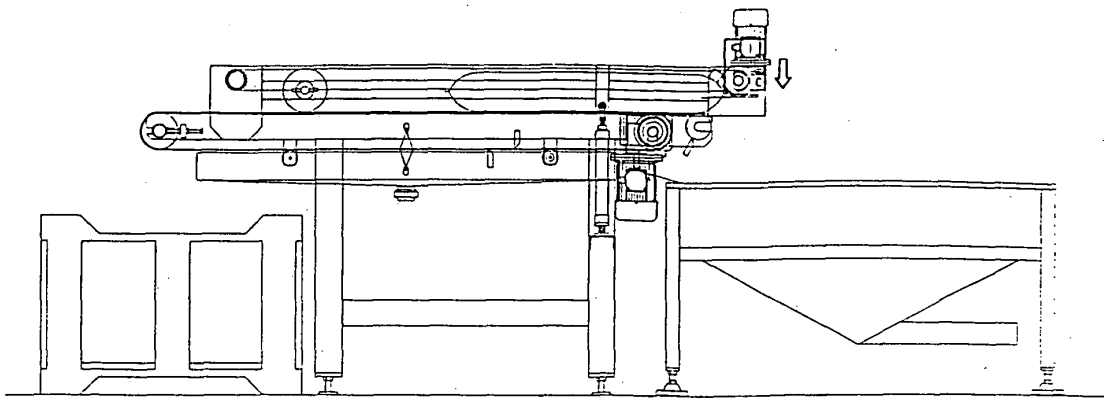


FIGURA 6

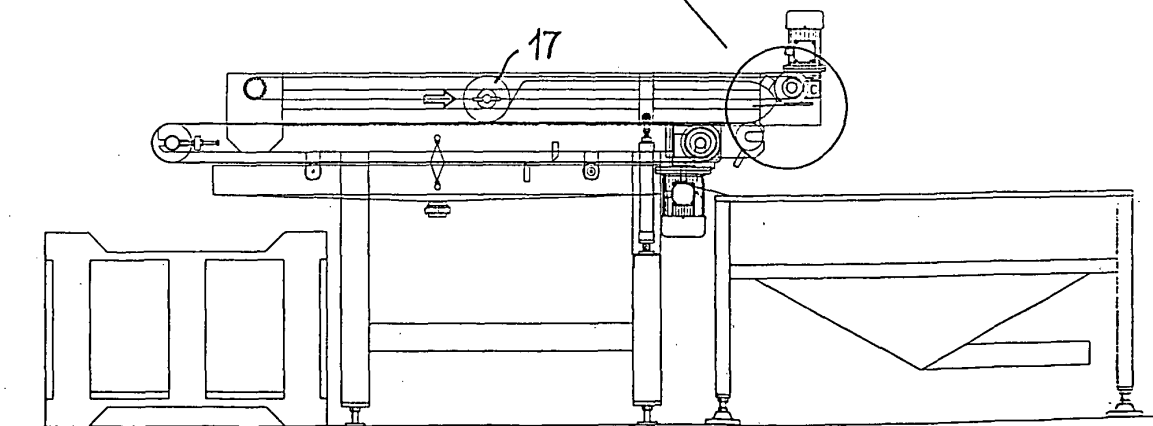
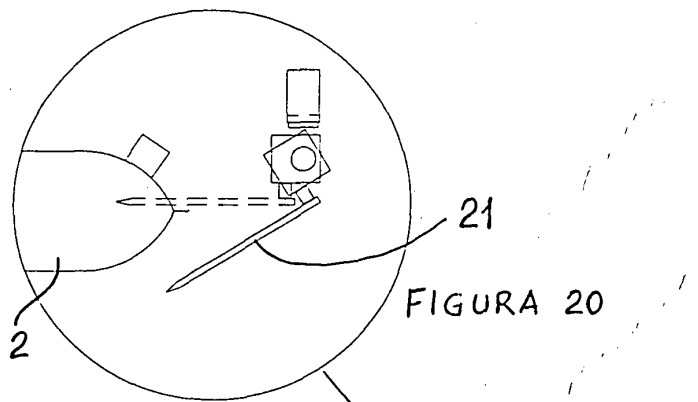


FIGURA 7

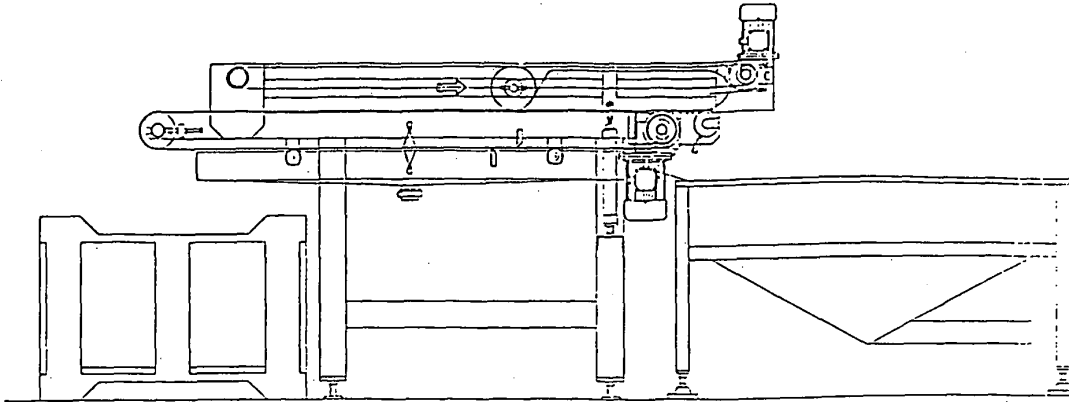


FIGURA 8

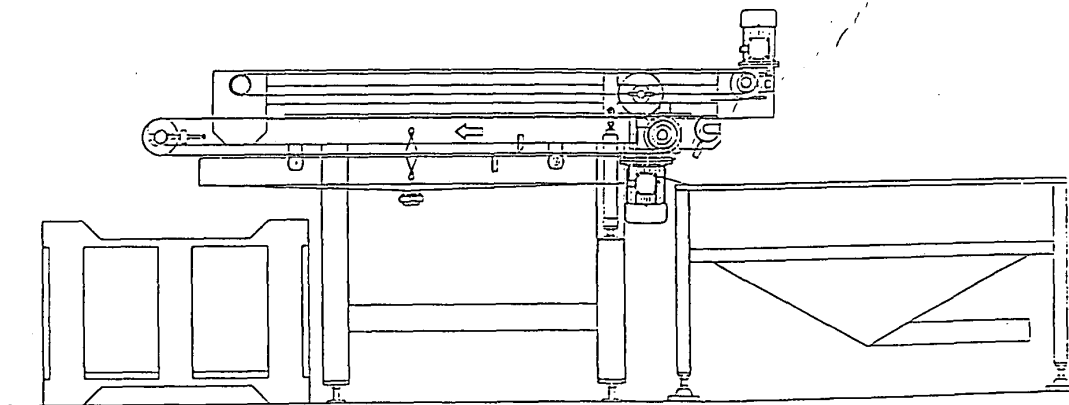


FIGURA 9

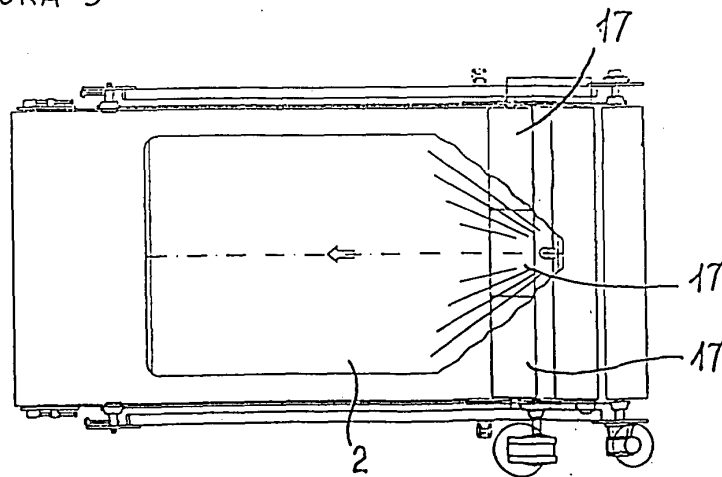


FIGURA 12

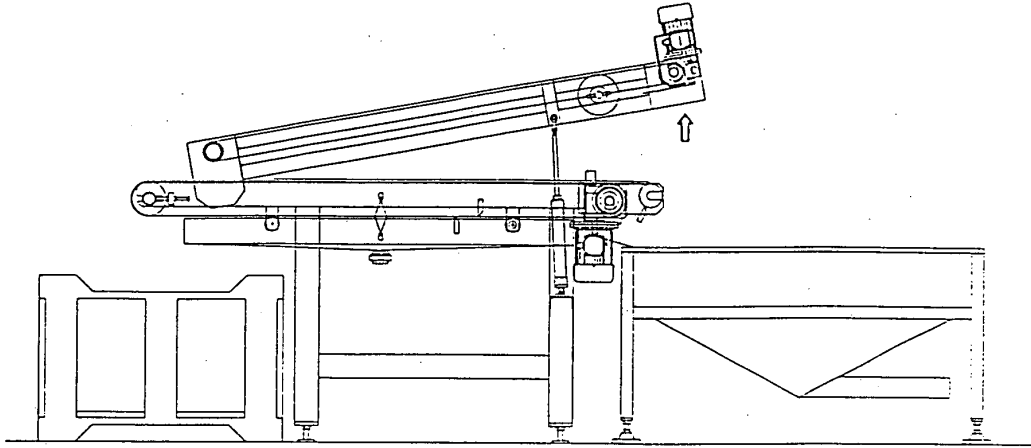


FIGURA 10

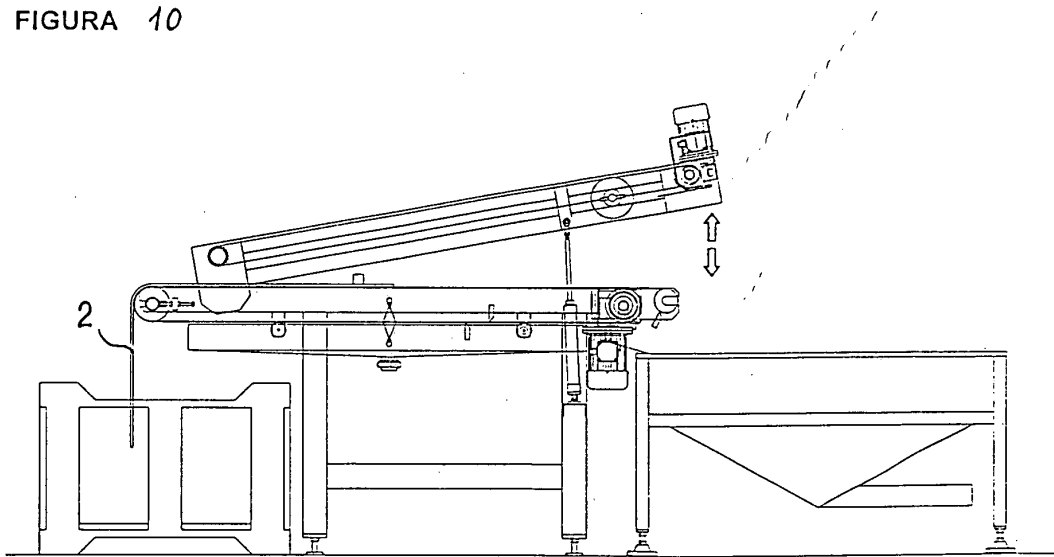
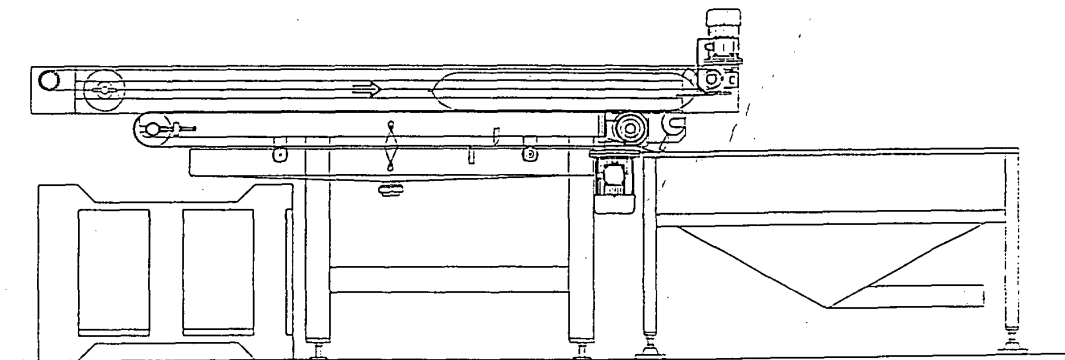
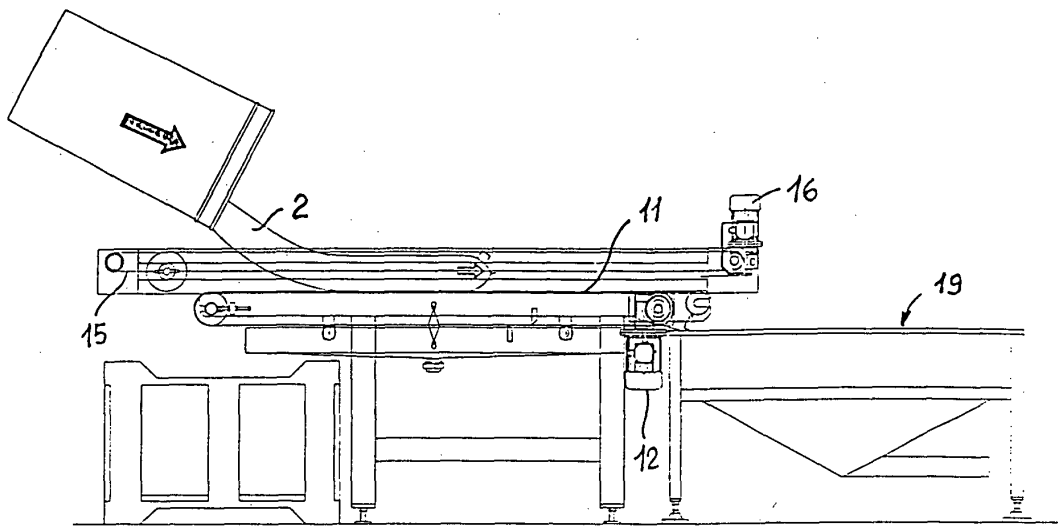


FIGURA 11



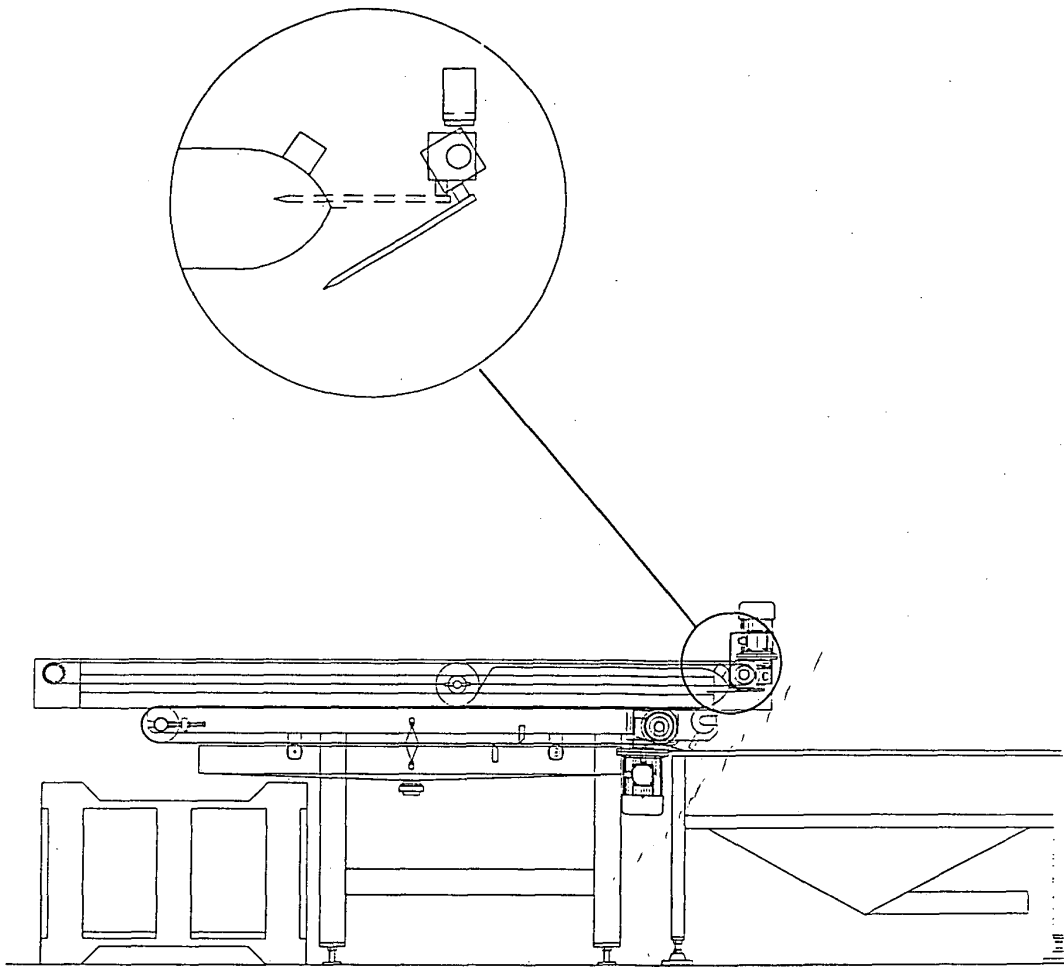


FIGURA 15

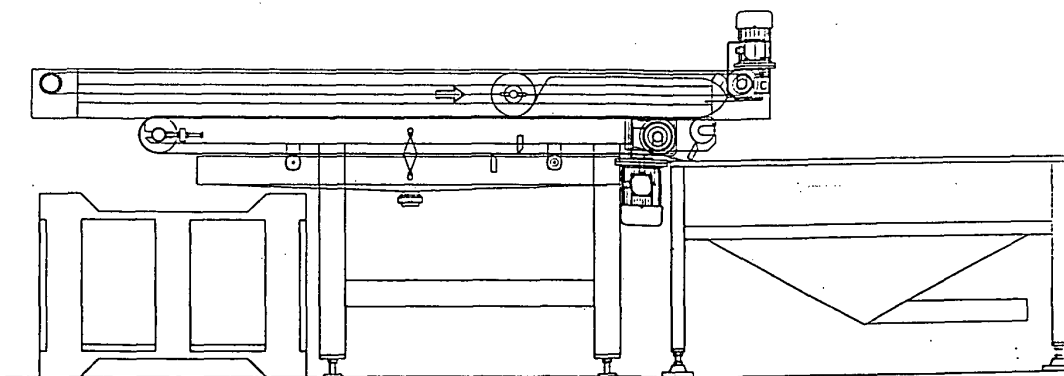


FIGURA 16

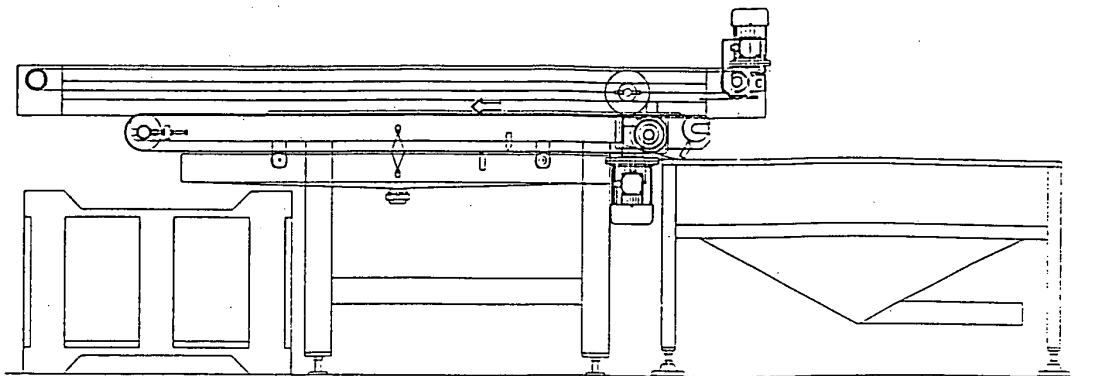


FIGURA 17

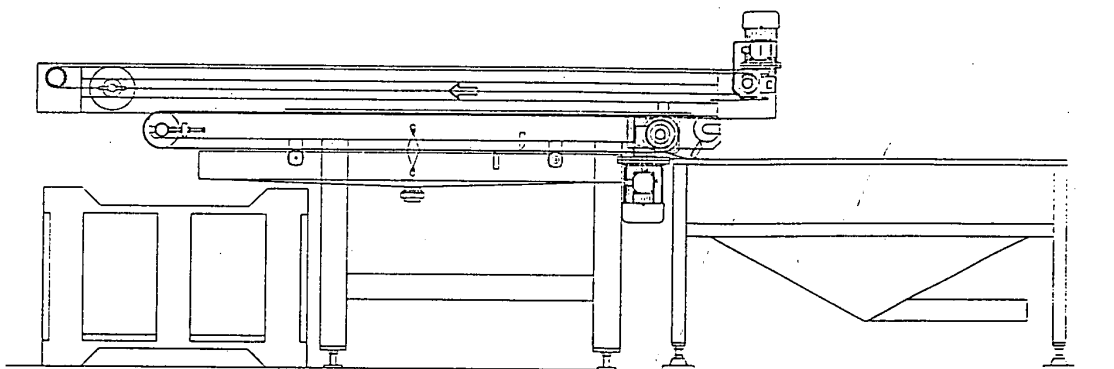


FIGURA 18

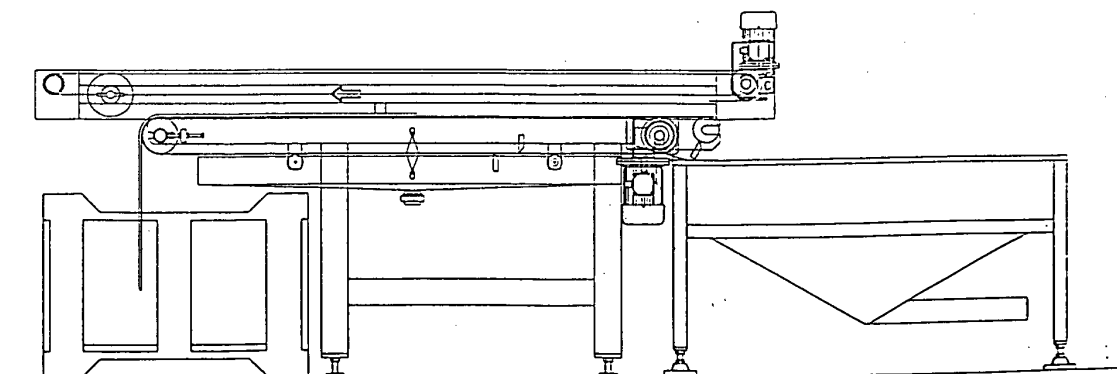


FIGURA 19



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EUROPEAN SEARCH REPORT

Application Number
EP 04 00 3948

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.7)
A	NL 9 201 563 A (TYPHOON MARTENS B V) 5 April 1994 (1994-04-05) * the whole document *	1,2,5-7	B65B69/00
A	US 3 265 249 A (STURE JANSSON JOHAN) 9 August 1966 (1966-08-09) * claim 1; figures 1,2 *	1,2,5-7	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B65B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 8 June 2004	Examiner Grentzius, W
CATEGORY OF CITED DOCUMENTS 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 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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 04 00 3948

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08-06-2004

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For more details about this annex : see Official Journal of the European Patent-Office, No. 12/82