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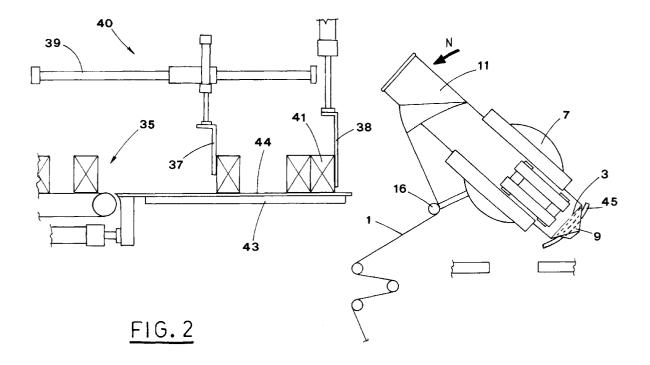
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(54) Machine for packaging a bulk product or groups of articles in a tubular bag

(57) In a machine for packaging bulk articles or groups of articles in a tubular envelope, a continuous sheet material (1) is placed around a sleeve (11) and conveyed by a pair of endless belts (18) to obtain a tube (4). A collar (12) is provided for guiding the continuous sheet material around the sleeve (11) while a welder (15) seals up the longitudinal edges of the continuous

sheet material (1). A feeder (40) for feeding articles is situated beside the sleeve (11)- collar (12) assembly, which is mounted on a frame (7) together with the endless belts and the welder (15). The frame (7) rotates about a horizontal axis and brings the sleeve (II) first to a horizontal position (H), in which the product or articles (41) are introduced therein, and then to a vertical position (V), in which the pack (5) is completed.



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Description

[0001] The present invention relates to a machine for packaging bulk articles or groups of articles in a tubular envelope or bag.

[0002] There are many known automatic machines that inserts articles or groups of single articles already packed, into an elongated side-sealed tube as it travels. [0003] Usually, these machines fill the tube at the same time when they make it, and they form completed, sealed packages or bags, ready for the market, which contain a certain amount of product or a pre-established number of articles.

[0004] Packs containing more articles previously wrapped one by one, are also known as multi-packs.
[0005] Basically, these machines for obtaining the tube from a sheet of heat sealable material, include:

feeding means for supplying the continuous sheet material, which form a continuous tube to be filled and is subsequently severed crosswise to obtain separate packs or bags;

a sleeve, around which the continuous sheet material is placed to form the tube;

an outer collar for guiding the continuous sheet material around the sleeve and for shaping externally the tube being formed;

welding means for sealing the longitudinal continuous, facing-each-other or overlapped edges of the sheet material;

pulling means, which push the continuous sheet material against the sleeve and rotate so as to advance the sheet material:

means for feeding product or articles to be packaged, usually including a hopper fastened to the top of the sleeve for conveying the product or articles therein, the product or articles then falling, due to gravity, inside the tube being formed;

welding and cutting means, which clamp the heat sealable continuous sheet material just below the sleeve base, then weld the tube crosswise in one or more points, and subsequently severs the tube to separate single envelopes.

[0006] The drawback of these known machines results from the fact that the product or articles must pass through the whole inner space of the sleeve while falling by gravity action.

[0007] If the product or articles are fragile, they can be damaged on the way to the bottom of the tube, due to striking or rubbing against the sleeve inner surface or against each other.

[0008] In particular, when more articles separately wrapped are to be put inside one bag, it is extremely difficult to obtain and maintain the desired arrangement with the articles in good order.

[0009] Although the sleeve inner shape exactly matches the articles outer shape, the latter can jam while falling along the sleeve because they tend to assume inclined positions thus increasing rubbing against the inner surfaces.

10 [0010] The object of the present invention is to propose a machine for packaging a bulk product or groups of articles inside a tubular pack or bag like the one just described, the machine being improved so as to overwhelm the disadvantages.

[0011] The proposed machine must be capable of packaging the bulk product or the articles, in a tubular pack or bag at the same time when the tube is being formed, without damaging the articles and/or changing their arrangement.

[0012] Another object of the invention id to propose a machine like the one of the prior art, improved in a way that no risk of jams inside the sleeve can occur.

[0013] Another object of the present invention is to propose a machine improved by a simple and effective technical solution, which is reliable and does not involve high production costs.

[0014] The above mentioned objects are obtained by a technical solution described in the preamble of the claim 1, improved according to the characterizing part of claim 1.

[0015] Other features of the invention are described in the subclaims.

[0016] The characteristics of the invention, not yet evident, will be pointed out in the following detailed description of a preferred embodiment, with reference to the enclosed drawings, which, by means of non-limitative examples, show:

- in Figures 1 to 8, schematic front views of the machine being the subject of the present invention, in the most characteristic steps of its operation;
- in Figure 9, a schematic front view of this machine with a variation of some of its parts.

[0017] With reference to the previously described figures, the machine for packaging bulk product or groups of articles in a pack or bag, includes means 10 for feeding the continuous sheet material 1 while placing it around a sleeve 11 to form an elongate tube 4, as in the know methods.

[0018] An outer collar 12, also known as "tie", is associated to the sleeve for conveying the continuous sheet. Welding means 15 seal the longitudinal edges of the continuous sheet 1, in overlapped or facing-eachother condition, for forming the tube.

[0019] The feeding means 10, which supply the continuous sheet material 1, include a reel 2, from which

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the continuous sheet 1 is unwound, and a series of turnabout rollers 6.

[0020] According to known techniques, the turnabout rollers 6 form a compensation mechanism, that compensate for slight differences between the quantity of the continuous sheet material unwound from the reel 2 and the quantity of the continuous sheet material actually used for forming the bags or packs.

[0021] The welding means include a heat welder of known type, which seals the longitudinal edges of the continuous sheet material in overlapped or folded and facing-each-other condition.

[0022] The tube portion longitudinally sealed and situated around the sleeve, will be hereinafter referred to as the envelope 3.

[0023] The continuous sheet material 1 is pulled by suitable means 18 including one or more motor powered endless belts, which press the continuous sheet 1 against the sleeve 11 for making it advance in direction A (Figure 1).

[0024] The figures show only one pair of endless belts 18, but obviously more pairs of endless belts can be provided, arranged along the sleeve circumference to increase the pulling action.

[0025] Cutting and welding means 30, situated at the bottom of the sleeve 11, include two heated plates 31, 32, which simultaneously seal and sever crosswise the tube 4, to seal and separate single packs or bags 5.

[0026] According to the invention, the sleeve 11, the collar 12, the welder 15 and the pulling endless belts 18 are mounted on an oscillating frame 7, which can rotate about a horizontal axis.

[0027] For sake -of clarity, only the sleeve will be referred to in the following, but it is understood that the movements of the sleeve involve also all the other elements integral therewith.

[0028] Driving means, not shown, since they are of known type, drive the frame to rotate about this horizontal axis, so that the sleeve 11 assumes, in alternative steps, a horizontal condition H and a vertical condition V, for the purpose which will be explained later.

[0029] Also according to the invention, the feeding means 40 for feeding the product or the articles being packed, are situated beside the frame 7, that supports the sleeve 11 and the collar 12.

[0030] The means 40 for feeding articles are aimed at introducing the product or articles 41 into the sleeve 11, bringing them up to the bottom of the envelope when the sleeve is in its horizontal condition H.

[0031] In this condition, the endless belts 18 are temporarily deactivated.

[0032] According to a first embodiment, the means 40 for feeding articles include a plate 44 situated near a sliding surface 43 and reciprocated horizontally, so as to enter the sleeve 11 when the sleeve is in its horizontal condition H.

[0033] According to another possible embodiment, these articles feeding means include a pusher 42, also

reciprocated horizontally, so as to enter the sleeve 11 kept horizontal.

[0034] The bulk product, or a number of articles 41, are accumulated orderly on the sliding surface 43 by manipulators equipped with dragging plates 37, 38 and operated by actuators 39 of known type.

[0035] According to the invention, the subject machine includes also folding means 45 which act on the bottom of the envelope 3 during rotation of the sleeve, so as to fold, in two steps, the edges welded in the region of the bottom.

[0036] The folding means include substantially a curved member 45, situated at the side of the frame 7 opposite to the articles feeding means 40, and in the intermediate position of the path followed by the bottom of the envelope 3.

[0037] The curve centre of the curved member 45 is aligned with the rotation axis of the oscillating frame 7. [0038] A pad 46, situated on the side of the sleeve opposite to the one having the articles feeding means 40 and at the bottom of the sleeve 11 in horizontal condition H.

[0039] The pad 46 is reciprocated horizontally by driving means, not shown, insofar as they are known.

[0040] Operation of the machine will be explained in the following, with reference to Figures 1 to 8.

[0041] When the sleeve 11 is in its vertical condition V, the endless belts 18 pull in direction A the continuous sheet material 1, supplied by the reel 2 via the turnabout rollers 6. The sheet material 1 is guided by the collar 12 and placed around the sleeve 11 while the welder 15 seals the longitudinal edges, thus forming a tube 4 (Figure 1).

[0042] The welding and cutting plates 31,32 are operated by moving them close to each other until they clamp, seal and sever the tube 4, separating therefrom the previously completed pack or bag 5 (Figure 8).

[0043] Then, the frame 7 is rotated, e.g. in counter-clockwise direction N.

[0044] The continuous sheet 1, passing between the series of turnabout rollers 6 and guided by the collar 12, is maintained tight by a suitable tightener roller 16.

[0045] During the intermediate rotation step, the curved member 45, which is narrower than the tube 4, strikes against the central part of the welded bottom 8, considered in crosswise direction, folding it in the direction opposite to the rotation and folding it toward the centre of the two outer wings 9 of the welded bottom (Figure 2)

O [0046] Meanwhile, the manipulators 37 and the dragging plates 38 place orderly the articles 41, that have been separately wrapped along the wrapping line 35 situated upstream of the subject machine.

[0047] When the rotation of the frame 7 is completed, the sleeve 11 is in horizontal condition H and its inlet opening is situated near the edge of the sliding surface 43.

[0048] Then, the plate 44 is operated, and enters the

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sleeve due to the action of a linear actuator 36. Motion of the plate 44 in the introduction direction T moves the articles up to the bottom of the tube (Figures 3 and 4).

[0049] At the same time, the pad 46 is moved in push direction S, so as to press the wings 9 of the welded bottom 8, making it assume a flat shape.

[0050] As can be understood from Figure 4, when the plate 44 completes its stroke, a raising device 34 is operated to act on the end of the plate 44 remaining outside the sleeve 11, thus raising it a bit.

[0051] This raising is enough to slightly push the articles 41 against the inner upper wall of the sleeve 11 opposite to the plate 44, so, when the plate 44 is retracted with a withdrawing movement R (Figure 5), the articles 41 are held at the bottom of the sleeve 11.

[0052] At the same time, the pad 46 is moved in direction P.

[0053] Afterwards, the frame 7 is rotated, e.g. in direction F, to bring the sleeve 11 back to its vertical condition V (Figure 6).

[0054] During the return rotation in direction F, the curved member 45 hits the wings 9 of the envelope 3 to stabilise their folding.

[0055] When the sleeve reaches its vertical position V, the articles contained in its lower part settle on the bottom of the envelope 3, which begins to go down due to reactivation of the driving endless belts 18 that subsequently pull another strap of sheet material 1 from the reel 2. In this way, the envelope 3 containing the product or articles 41 passes beyond the welding plates 31, 32 (Figure 7).

[0056] Afterwards, the welding plates 31, 32 are operated (Figure 8) to seal and separate the package 5 just formed.

[0057] Figure 9 shows another embodiment of the means 40 for feeding the articles, which include the pusher 42. Machine operation is not different from the previous one.

[0058] In this second embodiment the raising device 34 is missing, as the pusher return movement does not act in any way on the articles 41, which remain at the bottom of the sleeve 11.

[0059] This embodiment is more suitable when horizontally layered articles are to be packed, since the horizontal displacement of the articles one with respect to another could create problems if the previously described embodiment were used.

[0060] As it results obvious from the above description, the invention has advantages which correspond to the objects.

[0061] In fact, the subject machine packages bulk product or groups of articles inside a tubular pack or bag of the type described in the introductory statement, without damaging the articles integrity and their arrangement, and without risking jams of singularly packaged articles inside the sleeve.

[0062] Actually, due to the rotation of the sleeve in the horizontal position, it is possible to move the articles al-

ways on a horizontal plane, thus avoiding that the articles fall due to gravity and strike against the inner walls of the sleeve.

[0063] Moreover, the plate 44 and the pusher 42 move the articles always positively, thus avoiding jams possibility.

[0064] All this is obtained by a simple and effective technical solution, which is reliable and does not involve high production costs.

[0065] Having described the invention with reference to a preferred embodiment, it is understood that other possible variants, obvious to the experts in art, are within the protection of the invention as described above and claimed hereinafter.

Claims

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 Machine for packaging a bulk product or groups of articles in a tubular pack or bag, the machine including:

> feeding means (10) for feeding a continuous sheet material (1), which is aimed at forming a tube (4) from which an envelope (3) is obtained;

> an sleeve (11), around which said continuous sheet material (1) is placed to obtain the tube (4);

a collar (12) fixed to the sleeve and aimed at guiding the continuous sheet material around the sleeve and outer shaping the tube (4);

welding means (15) acting on facing-each-other or overlapped longitudinal edges of said continuous sheet material (1);

pulling means (18) acting on the continuous sheet material (1) placed in a tubular condition around the sleeve (11) to determine advancement for said continuous sheet material (1) in direction (A);

feeding means (40) for feeding a bulk product or groups of articles (41) to be packed, said feeding means conveying said product or articles inside said sleeve (11);

cutting and welding means (30) acting on said tube (4) in the region of the bottom of said sleeve (11), to seal crosswise a portion of said tube (4) and subsequently sever it to separate single packs or bags (5);

said machine being characterised in that said articles feeding means (40) are situated beside an assembly formed by said sleeve (11) and

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said collar (12), and in that said sleeve (11), said collar (12), said pulling means (18) and said welding means (15) are mounted on an oscillating frame (7), which can rotate about a horizontal axis, so as to determine, according to alternative steps: a horizontal condition for said sleeve (11), during which said articles feeding means (40) introduce the product or articles (41) into said sleeve (11) bringing them to the bottom of said sleeve (11), with said pulling means (18) in stop configuration; and

a vertical condition (V) for said sleeve (11), in which condition said pulling means (18) and said cutting and welding means (30) are operated again to complete formation of the pack or bag (5) from said envelope (3).

- 2. Machine, according to claim 1, characterised in that it includes also folding means (45) acting on the bottom of the envelope (3) during rotation of said sleeve (11) in order to fold, in two steps, the welded edges at said bottom.
- 3. Machine, according to claim 2, characterised in that 25 said folding means include a curved member (45) situated at the side of said sleeve (11) opposite to said feeding means (40) for feeding articles and in an intermediate position of the path followed by said bottom of said envelope (3), with curve centre of the curved member (45) aligned with the rotation axis of said oscillating frame (7), and with a movable pad (46) situated in a position opposite to said feeding means (40) for feeding articles, and near to the bottom of said sleeve (11) in horizontal condition (H).
- Machine, according to claim 1, characterised in that said feeding means (40) for feeding articles include a pusher (42), which takes over a number of articles or a bulk product (41) from a sliding surface (43) and moves along the sleeve (11) being in its horizontal condition (H), up to the bottom of said sleeve (11).
- **5.** Machine, according to claim 1, characterised in that said feeding means (40) for feeding articles include a plate (44) moving horizontally and aimed at taking over a number of articles (41) from a sliding surface (43), and at moving them along the sleeve (11) being in its horizontal condition (H), up to the bottom of said sleeve (11), with one end of said plate (44) being raised so that inclination of said plate (44) causing a rubbing of said articles (41) against the wall of said sleeve (11), thus preventing said articles from going out of said sleeve (11) during said plate (44) return movement (R) to a position outside said sleeve (11).

- 6. Machine, according to claim 1, characterised in that said feeding means (10) for feeding the continuous sheet include a reel (2) of continuous sheet material, and a series of turnabout rollers (6,16).
- Machine, according to claim 1, characterised in that said pulling means include at least one endless belt (18) carried by said oscillating frame (7).
- 10 8. Machine, according to claim 1, characterised in that said cutting and welding means include two heated plates (31,32) which seal and sever crosswise the tube (4) at the same time.

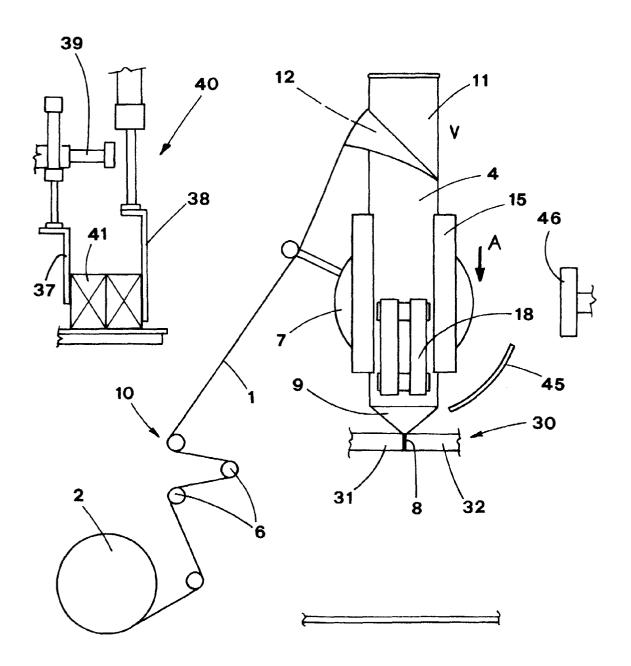
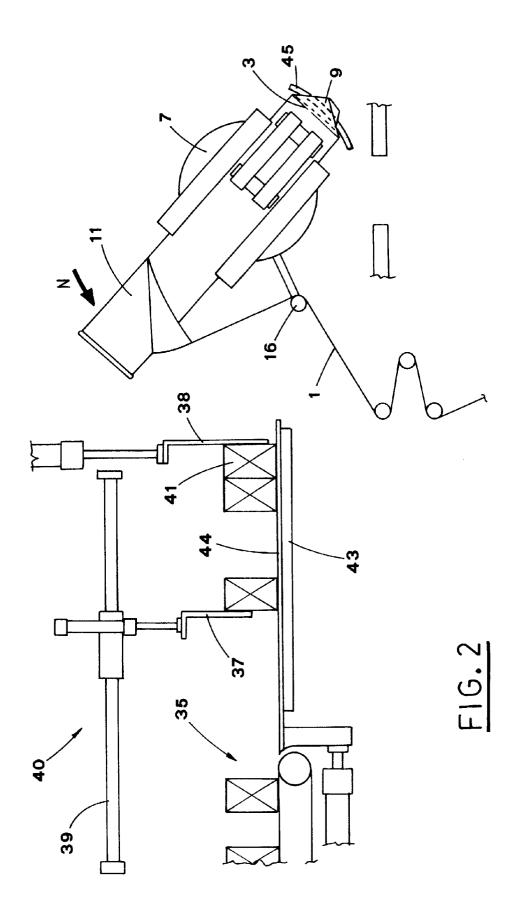
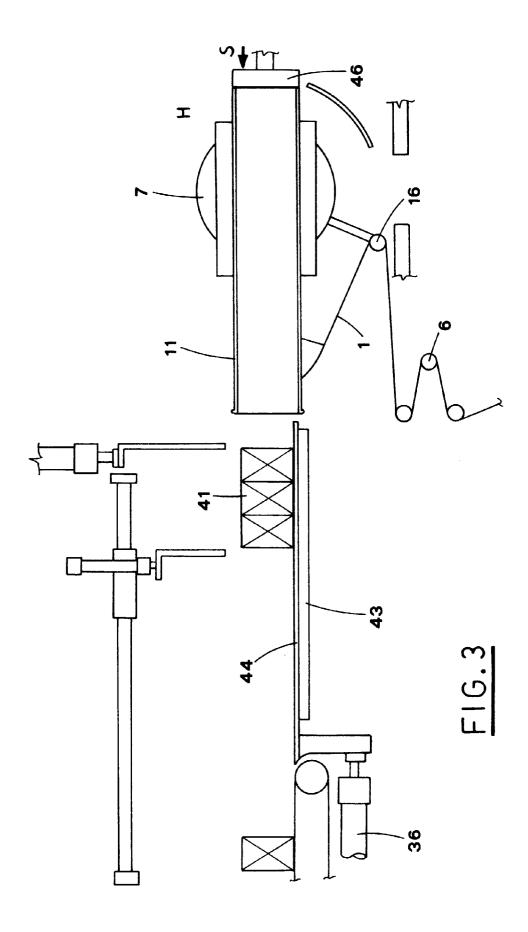
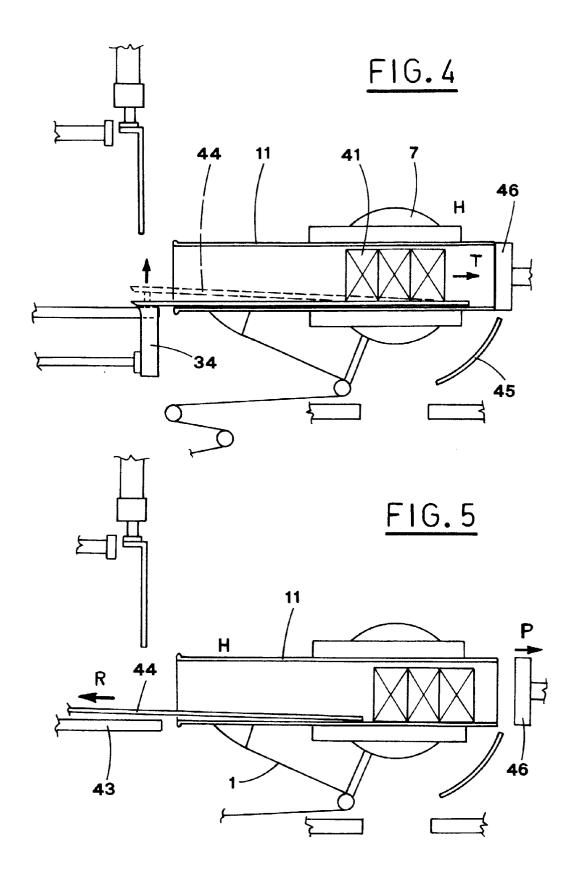
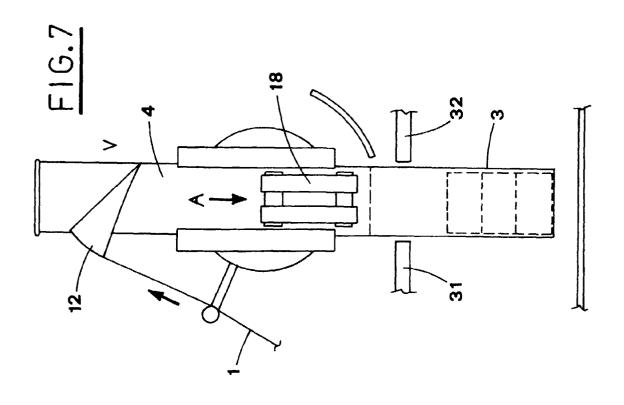


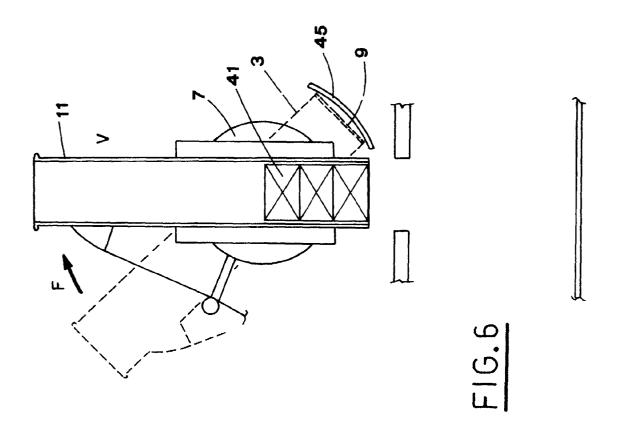
FIG.1

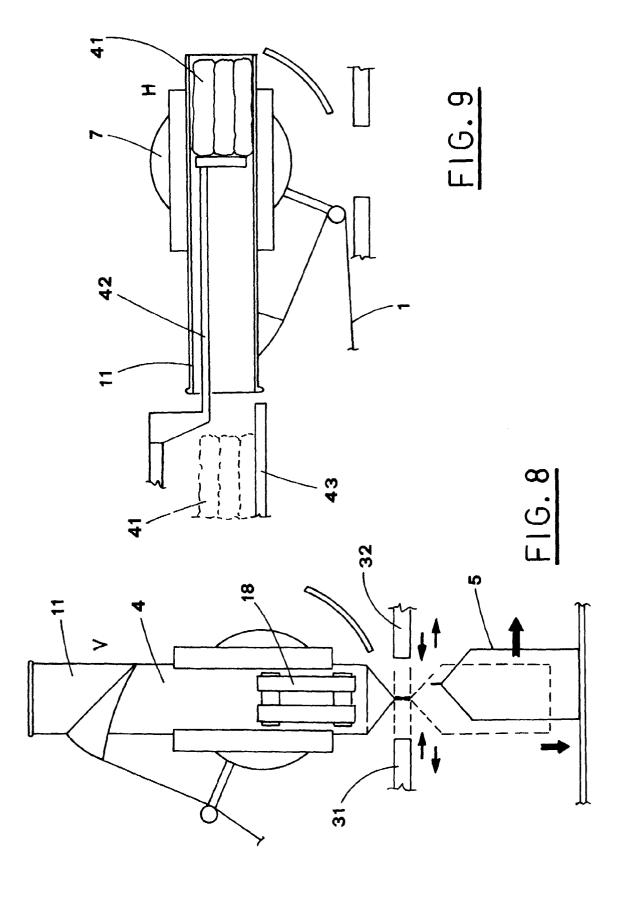














EUROPEAN SEARCH REPORT

Application Number EP 98 11 1024

DOCUMENTS CONSIDERED TO BE RELEVANT				
Category	Citation of document with inc of relevant passa		Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y	DE 19 29 956 U (HÖFL * page 2, line 15 - figures *	IGER & KARG) page 4, line 19;	1,6,8 2,4,7	B65B9/20
Υ	EP 0 573 811 A (ROVE * column 7, line 21 figures *	 [MA] 15 December 1993 - column 8, line 50;	2	
Υ	DE 19 15 044 U (H. M * page 4, line 15 - figures *		4	
Υ	FR 2 600 052 A (FUJI 18 December 1987 * page 10, line 8 -		7	
				TECHNICAL FIELDS SEARCHED (Int.Cl.6)
	The present search report has b			
Place of search THE HAGUE		Date of completion of the search 19 November 19		
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		E : earlier pate after the filin ner D : document o L : document o & : member of	T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filling date D: document cited in the application L: document cited for other reasons 8: member of the same patent family, corresponding document	