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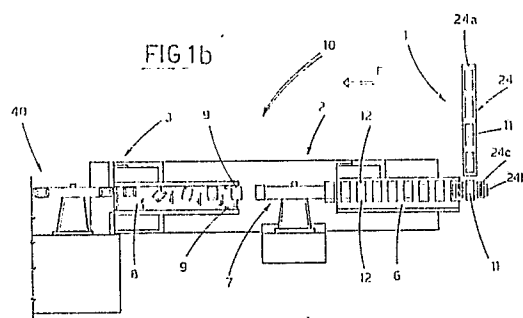
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54 **A process and a machine for folding back the end flaps in sealed packages containing foodstuff and subsequently wrapping the formed packages.**

57 The process, applicable to sealed packages (11) containing foodstuff provided with two end flaps (12) disposed in substantially coplanar relation with the packages themselves and extending outwardly from the opposite sides of the same, carries out the bending of said end flaps (12) at right angles to their extension direction, the folding back of the corners (12a) of said flaps, a further folding over of the end flaps (12) themselves as far as they are disposed upon the packages, in contact therewith, and the subsequent application of an enfolding band made of covering material in order to form a wrapping retaining said end flaps (12) after their folding back.



Description

A process and a machine for folding back the end flaps in sealed packages containing foodstuff and subsequently wrapping the formed packages

The present invention relates to a process and a machine for folding back the end flaps in sealed packages containing foodstuff, such as for example tablets of chocolate and the like, and subsequently wrapping the packages thus formed.

The invention is described in detail in the following with reference to the accompanying drawings showing an embodiment thereof given by way of non limiting example.

In the drawings:

- Fig. 1 represents, in two sheets, a diagrammatic plan view of the entire machine carrying out the process of the invention;

- Figs. 2 to 5 show the steps of the process in question and the different machine apparatus carrying out said steps.

Referring to the drawings, the process of the invention is adapted to be performed with packages, referenced by 11, provided with two end flaps 12 disposed in almost coplanar relation with the packages themselves and extending outwardly from the opposite sides of the same and it consists of the following steps in succession:

- bending of the end flaps 12 to a position at right angles to the preceding extension plan of the same;
- folding over of the corners 12a of the free end of said end flaps 12 as far as they are disposed upon the flaps themselves;
- further folding over of the end flaps 12 as far as they come in contact with the surface of the respective packages 11;
- application of an enfolding band 15 made of covering material to at least four faces of the packages so as to completely or partly cover the end flaps 12 after folding.

The last mentioned step can be carried out by wrapping the band 15 either only around the faces of packages 11 devoid of the end flaps 12 or around the faces of said packages from which the end flaps 12 project. At all events, as already said, the end flaps 12 must be covered at least partly in order to prevent them from taking their starting configuration again.

The machine according to the invention, adapted to perform the above process and identified as a whole at 10 in Fig. 1, substantially consists of four working stations disposed in succession and denoted by reference numerals 1, 2, 3 and 4 respectively.

Station 1 comprises a horizontal conveyor belt 6 the upstream end of which relative to its feed direction F is located below a connecting means 24 designed to connect it to the machine that makes packages 11. In the embodiment shown said means consists of a conveyor belt 24a at right angles to belt 6 and of a pair of parallel upright toothed belts 24b defining, with their respective teeth 24c, an equal number of cells parallel to the conveyor belt 24a holding the individual packages 11. Should the belts 24b be moved continuously it is possible to have the end of the conveyor belt 24a close to belts

24b moved along a vertical axis so that packages 11 are kept in a parallel position while being transferred on teeth 24c.

Packages 11 resting on belt 6 are moved forward being oriented with their end flaps 12 at right angles to the feed direction F of said belt 6.

Station 2 consists of a wheel rotatable about a horizontal axis at right angles to the feed direction F of packages 11 and provided with radial seats 7a for receiving packages 11 coming from belt 6 (see Fig. 3).

Seats 7a are laterally open and their size, measured along the axis of wheel 7, is not larger than the product contained therein so that at least the end flaps 12 can project therefrom.

Folding means 25 (see Fig. 3) is provided on either side of the wheel 7 and along its upper arc in the region of the side openings of radial seats 7a.

Said means consists, on each side of the wheel 7, of three flat arc-shaped guide bars 31, 32, 33 bent according to different bending radii. The middle bar 32 is flat and at right angles to the axis of rotation of wheel 7 and is substantially in the form of a triangle, with a transverse size measured along the radial directions of wheel 7, which decreases concordantly with the feed direction of the latter. The side bars 31, 33 are in coplanar relation with each other and disposed slightly outwardly to the middle bar 32, their upstream ends being warped towards the wheel 7. The shape of these side bars 31 and 33 substantially matches the shape of the middle bar 32 except for a guide channel for the corners 12a of the end flaps 12 in packages 11.

Packages 11 are brought by wheel 7 close to the middle bar 32 which causes the bending of flaps 12 in packages 11. Subsequently the corners 12a of flaps 12 come in contact with the warped ends of the side bars 31 and 33 and move within and along the guide channels defined by the middle 32 and side 31 and 33 bars and, due to the fact that they converge, corners 12a are folded over upon the respective flaps 12.

The third station comprises a conveyor belt 8 moving below helical guides 9 disposed close to the flaps 12 so that they are further folded as far as they come in contact with the upper face of the respective packages 11. Provided along the belt 8 are two fingers 13, at least one of which is movable in either way, along a vertical axis and along the feed direction of the belt 8. The movable finger 13 is lowered behind each package 11 and moved concordantly with the belt 8 but with a higher speed than the latter so that it causes the rotation of package 11 through 90°.

Between stations 3 and 4 provision is made for a wheel 40 rotating about a horizontal axis and provided with housings for holding packages 11 which are unloaded after half a revolution of the wheel 40 itself. In this manner packages 11 are overturned and they are fed to station 4 with their

flaps 12 disposed underneath.

Station 4 consists of a wheel 22 provided with radial pliers and rotatable about a horizontal axis parallel to the axis of wheels 7 and 40. Each pair of pliers 21 consists of two jaws 19 and 20 of different length articulated on axes parallel to the axis of wheel 22. Jaw 19 disposed upstream to the direction of rotation of wheel 22 is longer than the size of packages 11 measured along the direction of the jaw itself and its end is fork-shaped. The other jaw 20 is shorter than packages 11.

Station 4 also comprises means 26 feeding a strip 14 made of covering material and cutting it transversely into bands 15. Bands 15 are longer than the overall circumferential extension of packages 11 measured concordantly with the direction of rotation of wheel 22 and their width is not larger than that of packages 11 taken along the axis of rotation of the same wheel.

Associated with the wheel 22 are: means (not shown) designed to introduce the bands 15 into the jaws 19 and 20 and fold them to form two end portions 17 and 18 of different length, means 27 feeding adhesive material 23 to the inner face of the free end of the longer end portion 18 in bands 15, a fork-shaped element 28 the teeth 28a of which pass between the teeth of the long jaws 19 and a plate 29 moving along a radial direction of wheel 22.

Each band 15 is accommodated between jaws 19 and 20 so that its longer end portion 18 is in contact with the longer jaw 19. A means not shown pushes packages 11 between the respective bands 15 folded and retained as above specified, then the application of adhesive material is carried out and the fork 28 performs the operation of folding over the long portion 18 upon the package face opposite that of introduction into the band 15 and finally the plate 29 folds the free end of said long portion 18 as far as it comes in contact with the short portion 17 to which it adheres.

On coming out of the wheel 22 packages 11 thus formed can be fed, as shown in Fig. 1, to a subsequent station 5 where they are gathered to form groups and packed according to known procedures and using known apparatus not described.

Wheels 7, 40 and 22 are internally hollow so that they can house means 34 acting through the same and designed to cause the ejection of packages as diagrammatically shown in Fig. 2 in connection with wheel 7.

The invention as conceived is susceptible of many modifications and variations, all falling within the scope of the inventive idea characterizing it. In addition, all of the details can be replaced by other technically equivalent elements.

Claims

1. A process for folding back the end flaps in sealed packages containing foodstuff, such as for example the hermetically closed packages of chocolate tablets and the like, and for subsequently wrapping the formed packages;

said packages (11) being provided with two end flaps (12) disposed in almost coplanar relation with the packages themselves and extending outwardly from the opposite sides of the same, characterized in that it comprises the following steps:

- bending of the end flaps (12) to a position at right angles to the preceding extension plan of the same;

- folding over of the corners (12a) of the free end of said end flaps (12) as far as they are disposed upon the flaps themselves;

- further folding over of the end flaps (12) with folded corners as far as they come in contact with the surface of the respective packages (11);

- application of an enfolding band (15) made of covering material to at least four faces of said packages (11) so as to completely or partly cover said end flaps (12) after folding.

2. A process according to claim 1, characterized in that said band (15) made of covering material is wrapped about four faces of said packages (11), those from which said end flaps (12) project included.

3. A process according to claim 1, characterized in that said band (15) made of covering material is wrapped about four faces of said packages (11), those from which said end flaps (12) project excluded.

4. A machine for folding back the end flaps in sealed packages containing foodstuff, such as for example the hermetically closed packages of chocolate tablets and the like, and for subsequently wrapping the formed packages; said machines putting into practice the process as claimed in claim 1, characterized in that it comprises, in succession, at least:

- a first feed station (1) comprising first conveying means (6) supplied with packages from connecting means (24) designed to connect it to the machine that makes said packages (11), which packages (11) are supplied to said first conveying means (6) being oriented with their end flaps (12) substantially in coplanar relation and extending from the opposite sides of the respective packages, at right angles to the feed direction (F) of the latter;

- a second transferring, overturning and folding station (2) for carrying out the transferring and overturning of said packages (11) and a first bending operation on the package end flaps (12), comprising first transferring means (7) in the form of a wheel rotatable about a horizontal axis at right angles to the feed direction (F) of the packages (11) and provided with radial seats (7a) for receiving said packages (11); said seats (7a) being laterally open and having a size, measured along the extension direction of said flaps (12), which is not larger than that of the product contained therein so that at least the end flaps (12) can project therefrom; first folding means (25) being provided on either side of the wheel (7) in the region of the side openings of said radial seats (7a) and acting

along an upper arc of said wheel (7), on the end flaps (12) of said packages (11), so as to bend them at right angles to their extension direction and in opposition to the feed direction of the wheel (7) and subsequently fold back the corners (12a) of said flaps concordantly with the same feed direction;

- a third folding station (3) for folding back said end flaps (12), comprising second conveying means (8) extending below second folding means (9) consisting of fixed helical guides acting on said end flaps (12) so as to further fold them back as far as they come in contact with the upwardly oriented face of the respective package (11);

- a fourth wrapping station (4) comprising:

. means for feeding a strip (14) made of covering material and cutting it into bands (15);

. means for transversely folding said bands (15), with the formation of two end portions (17, 18) of different lengths, and introducing said thus folded bands (15) into the jaws (19, 20) of radial pliers (21) in second transferring means (22) consisting of a wheel rotatable about a horizontal axis at right angles to the feed direction (F) of the packages (11);

. feed means (27) for applying adhesive material (23) to the inner surface of the free end of the longer end portion (18);

. first and second folding means (28, 29) for transversely folding said longer end portion (18) as far as it comes upon the short end portion (17);

said first and second transferring means (7, 22) consisting of a rotatable wheel being provided with corresponding means (34) for ejecting the packages (11) therefrom at the end of the respective steps.

5. A machine according to claim 4, characterized in that said folding means (25) associated with said wheel (7) consists, on each side of said wheel, of three flat arc-shaped guide bars (31, 32, 33) bent in their lying plane according to different bending radii, the middle bar (32) being flat and at right angles to the axis of rotation of the wheel (7) and having a size, measured along radial directions of said wheel (7), which decreases concordantly with the feed direction of the latter and the side bars (31, 33), which are in coplanar relation with each other and disposed slightly outwardly to the middle one (32), having their upstream ends warped towards said wheel (7) and their width being such as to substantially compensate for the reduction in width of the middle bar except for a guide channel for the corners (12a) of the end flaps (12) in packages (11).

6. A machine according to claim 4, characterized in that said third station (3), downstream of said second folding means (9) relative to the feed direction (F) of the packages (11), comprises means (13) adapted to cause said packages (11) to rotate through 90° about a vertical axis and consisting of at least a pair of vertical fingers, at least one of which is movable

in either direction, along a vertical axis and along the feed direction of said second conveying means (8).

7. A machine according to claim 4, characterized in that the jaws (19, 20) of said radial pliers (21) have different lengths, the longer of them being provided at its free end with longitudinal open housing (3) passed through by the teeth (28a) of a fork-shaped element forming said first folding means for said bands (15).

8. A process for folding back the end flaps in sealed packages containing foodstuff, such as for example the hermetically closed packages of chocolate tablets and the like, and for subsequently wrapping the formed packages; said packages (11) being provided with two end flaps (12) disposed in almost coplanar relation with the packages themselves and extending outwardly from the opposite sides of the same, characterized in that it comprises the following steps;

- feeding of packages disposed parallelly in individual succession along first conveying means (6), said end flaps (12) to be folded extending at right angles to the feed direction (F);

- introduction of each package (11) into respective seats (7a) provided in first means (7) rotatable about an axis at right angles to the feed direction (F) of said packages (11) and designed to transfer the latter onto second conveying means (8); said seats (7a) being laterally open and having a size, measured along the extension direction of said flaps (12), which is not larger than that of the product contained therein so that at least the end flaps (12) can project therefrom;

- first bending of said end flaps (12) at right angles to their extension direction and in opposition to the feed direction (F) of said first transferring means (7) and simultaneous folding of the corners (12a) of the free end of said end flaps (12) concordantly with the feed direction (F) of said first transferring means (7);

- overturning, by said first transferring means (7), of said packages (11), which are laid on said second conveying means (8) with their folded end flaps facing upwardly; said folding and overturning steps taking place simultaneous with said transferring step from the first (6) to the second conveying means (8);

- forward movement of the packages (11), below means (9) adapted to cause a second folding of said end flaps (12) already bent at right angles to their extension direction, as far as they come in contact with the upwardly oriented surface of the respective packages (11);

- optional rotation of the packages (11) through 90° about a vertical axis, so that the extension direction of the end flaps (12) thus folded in packages (11) coincides with the feed direction (F) of said packages (11);

- transverse cutting of a strip (14) made of

covering material moved forward at right angles to the feed direction (F) of said packages (11), so as to form bands (15) longer than the entire circumferential extension of said packages (11) measured along the feed direction (F) thereof and not wider than the size of the packages taken along a direction at right angles to the feed one (F);

- folding of said band (15) along two transverse parallel lines (16) substantially spaced apart from each other by the thickness of said packages (11), forming two end portions (17, 18) of different lengths, the shorter end portion (17) being as long as the length of said packages (11) measured along the feed direction (F) thereof;

- introduction and holding of said folded bands (15) into the jaws (19, 20) of radial pliers (21) being part of second transferring means (22) rotatable about an axis at right angles to the feed direction (F) of said packages (11);

- introduction of said packages (11) into the retained bands (15) until the packages come in contact with the intermediate portion thereof;

- application of a layer of adhesive material (23) to the inner surface of the longer end portion (18) of bands (15);

- first folding of said longer portion over the respective package (11) until it comes in contact with the face of said package opposite that of introduction between the two end portions (17, 18) of the respective band (15) retained between the jaws (19, 20) of a corresponding pair of pliers (21) being part of said second transferring means (22) and in contact with said intermediate portion of the respective band (15);

- second folding of said longer end portion (18) of the band (15) after the first folding over, as far as it is disposed upon the shorter portion (17) of said band (15), so as to form a complete wrapping about the respective package (11) along its direction of introduction into said pliers (21);

- feeding of the wrapped packages (11) to a subsequent station (5) designed to form groups of them and pack the formed groups.

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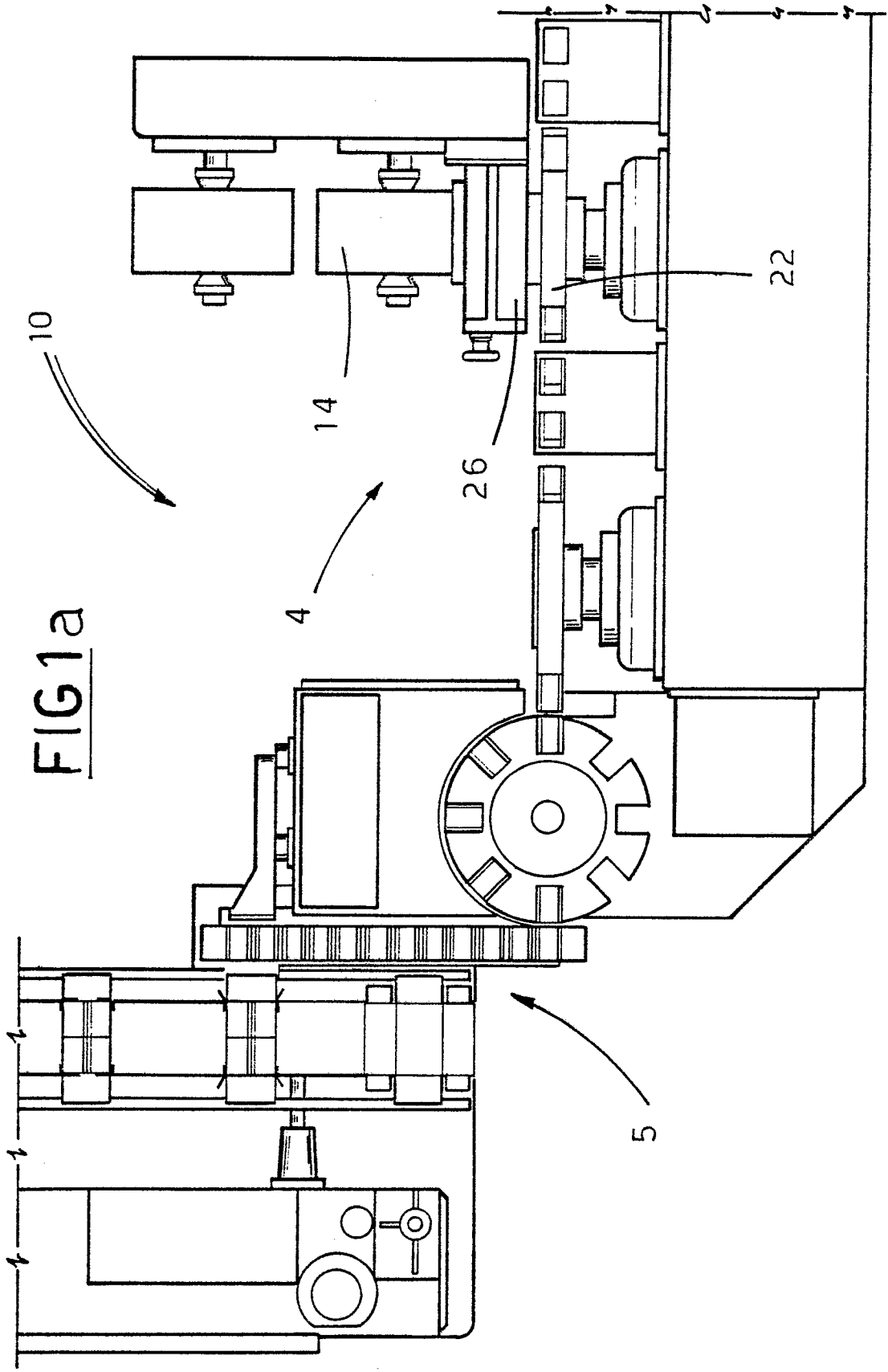
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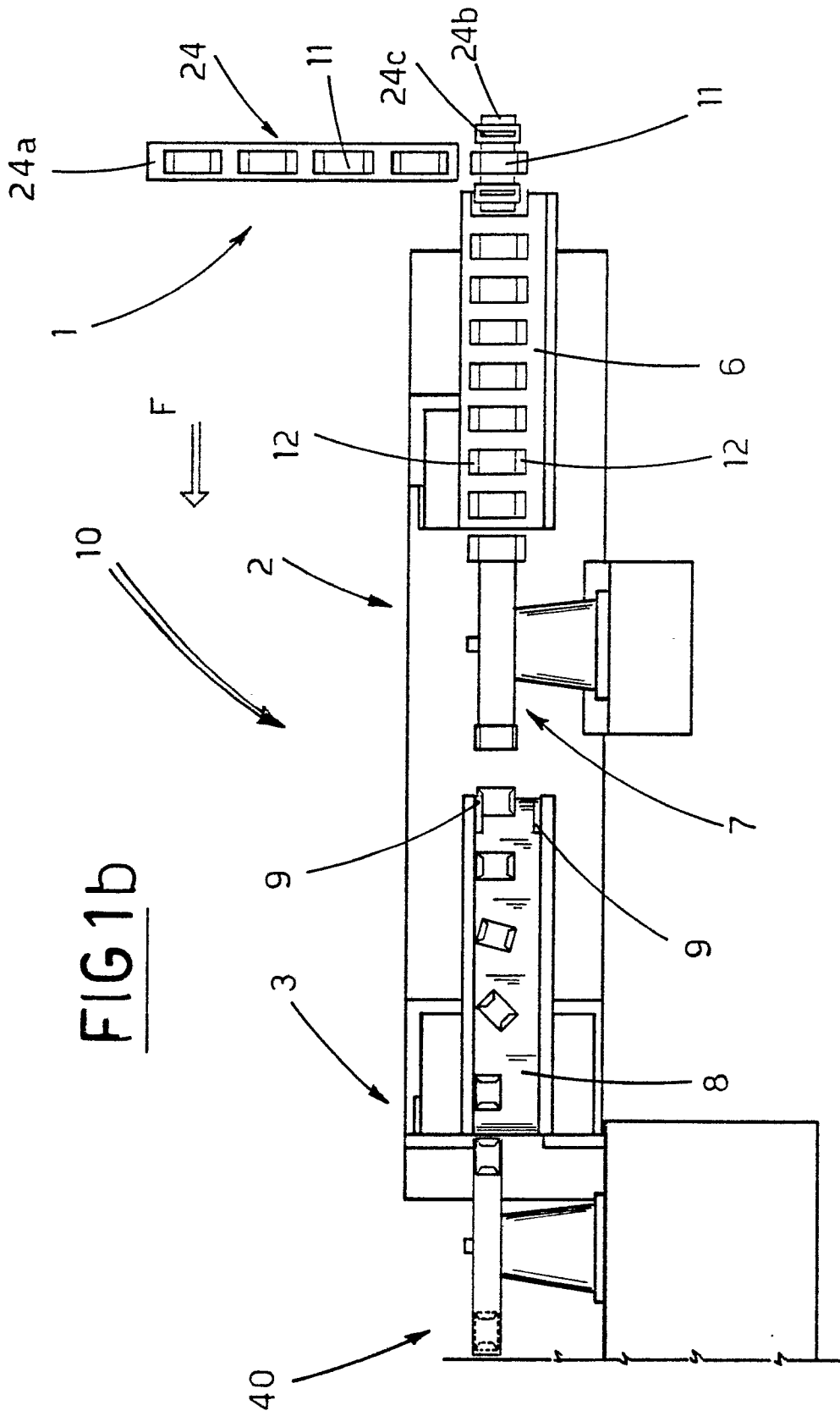
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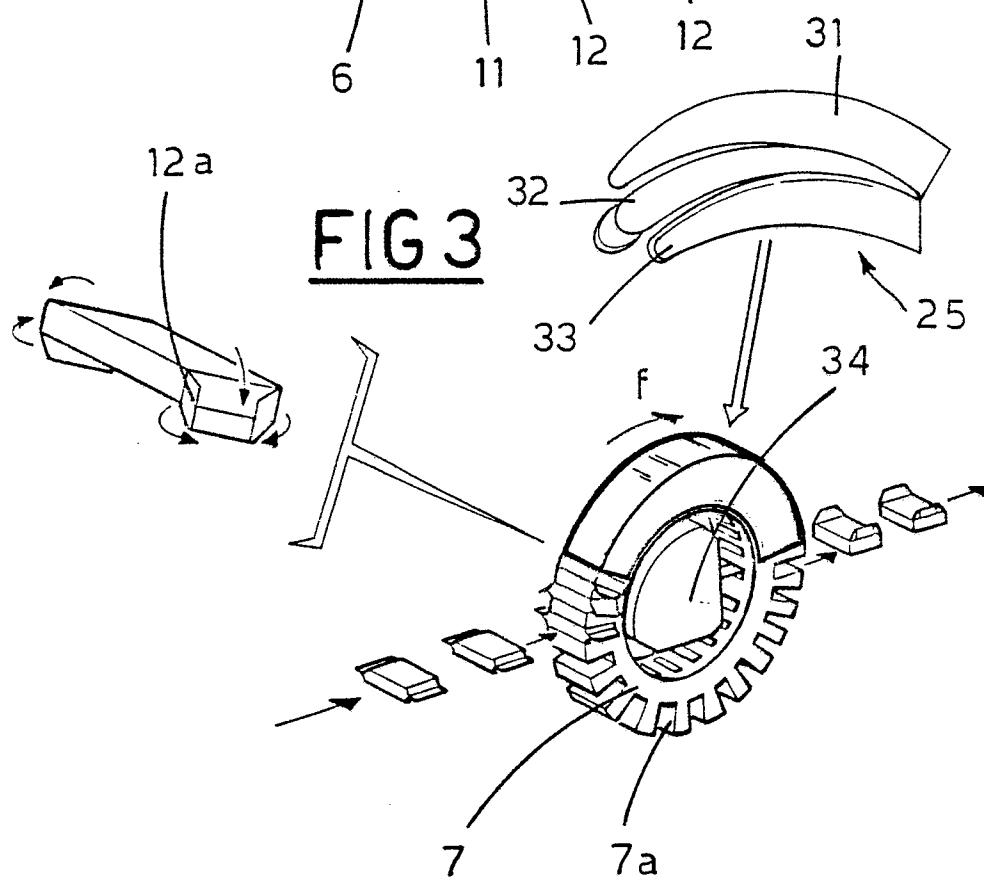
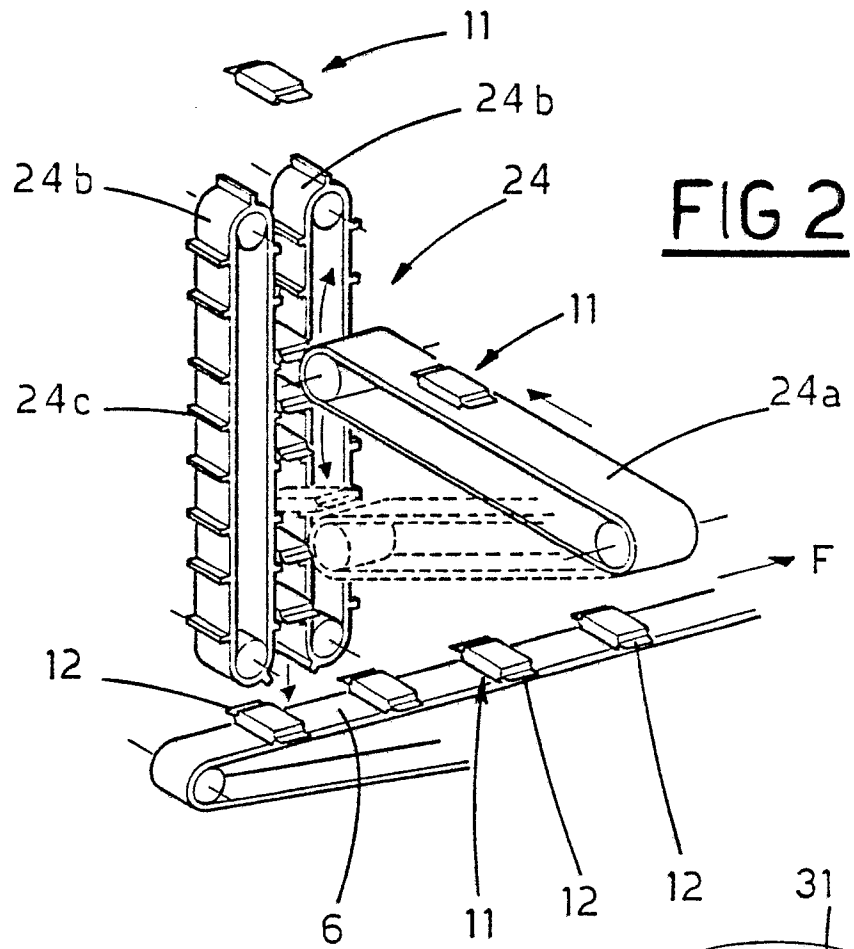
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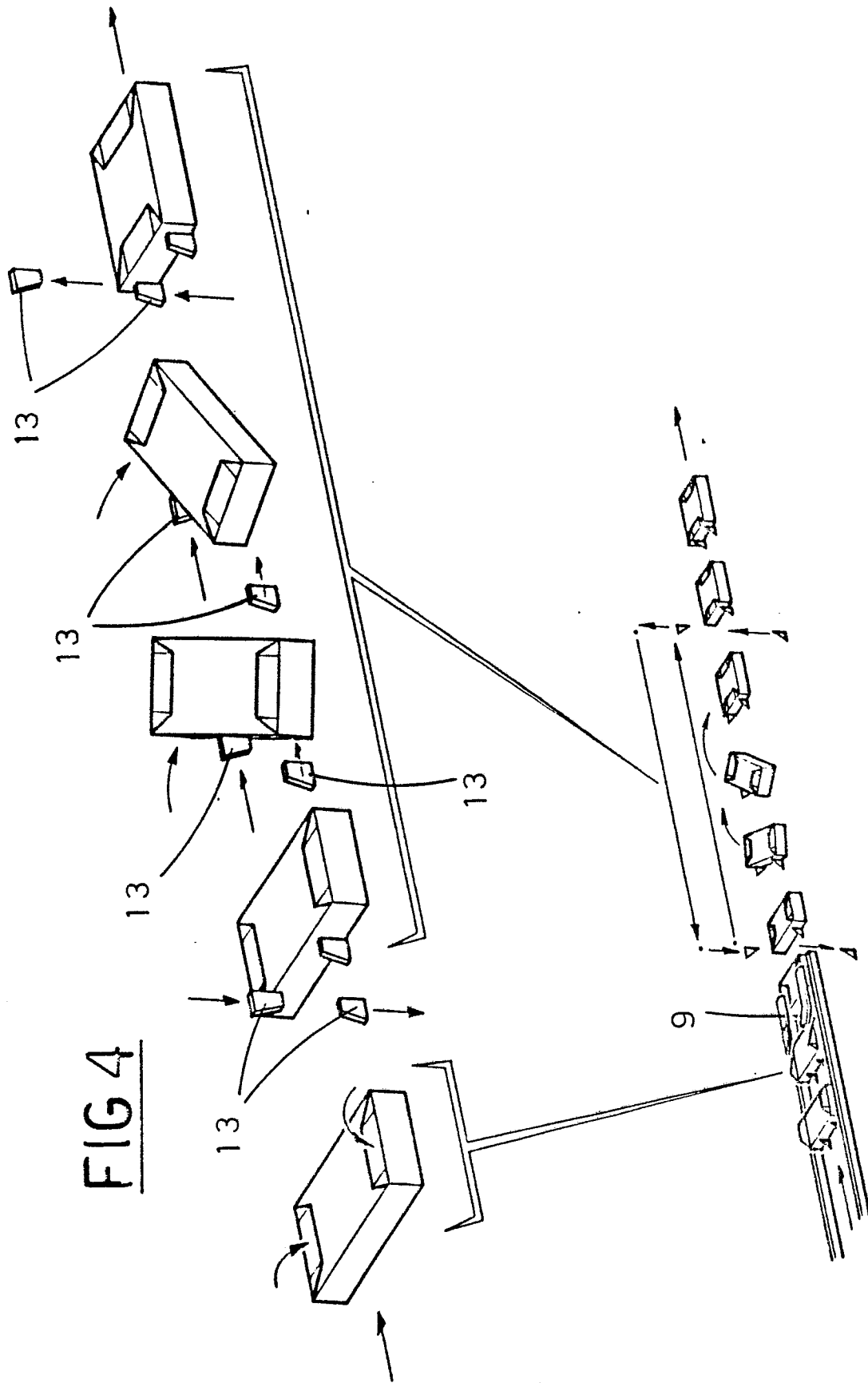
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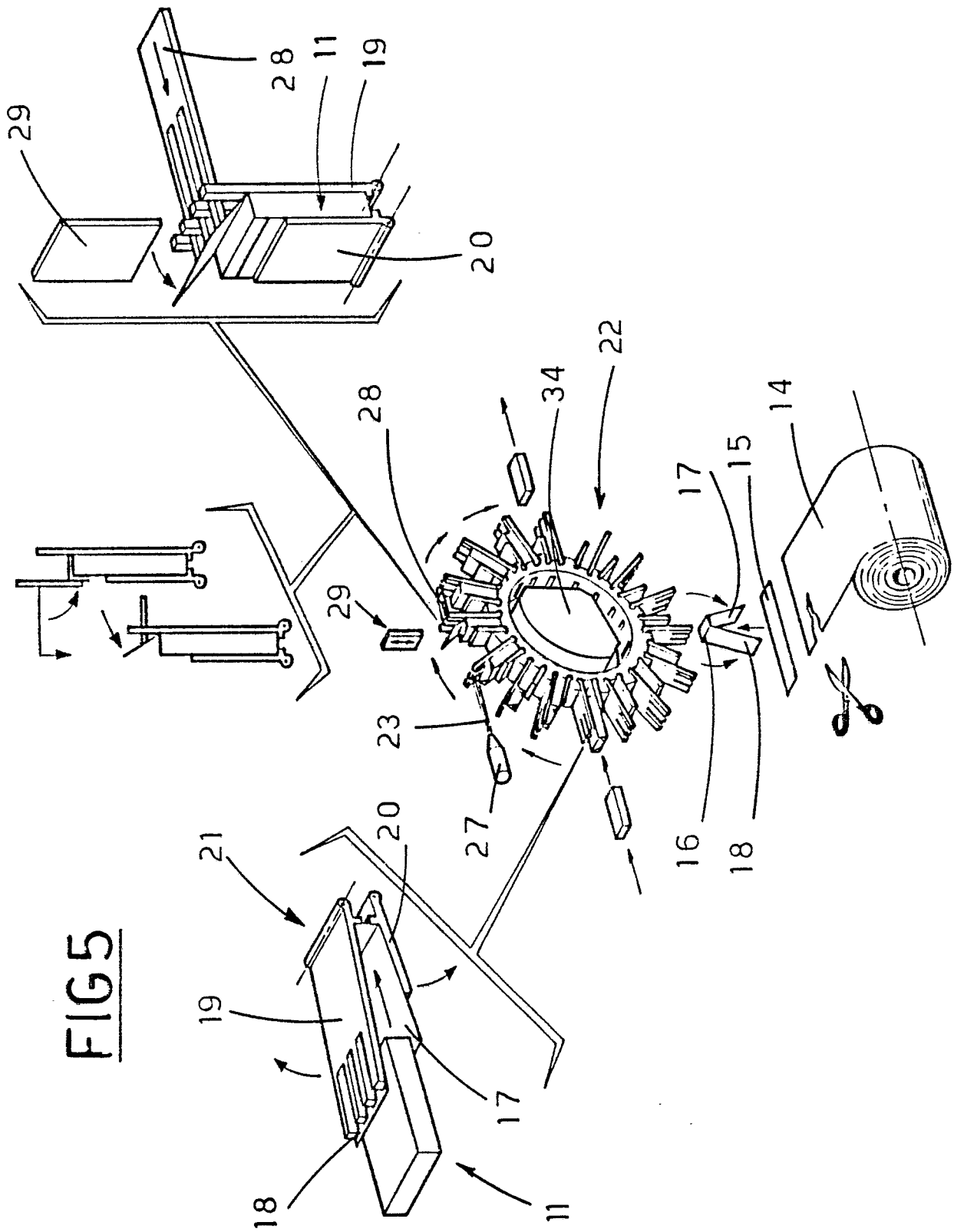
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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
Y	US-A-2 006 564 (TOWNSEND) * Page 4, column 1, line 63 - page 5, column 1, line 45; figures 2B,14,14A,15,28-33 *	1,2	B 65 B 11/58 B 65 B 61/24
A	---	4,8	
Y	FR-A- 415 443 (GROVER) * Page 2, line 90 - page 3, line 21; figures 1-4 *	1,2	
A	---	4,8	
A	FR-A-1 429 897 (DOW CHEMICAL) ---		
A	NL-A-6 810 166 (FLOWER) -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 65 B
Place of search THE HAGUE		Date of completion of the search 07-09-1989	Examiner CLAEYS H.C.M.
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