



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
31.01.2018 Bulletin 2018/05

(51) Int Cl.:
B65B 69/00 (2006.01) **B26D 1/02** (2006.01)
B26D 1/04 (2006.01)

(21) Application number: **17182156.4**

(22) Date of filing: **19.07.2017**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

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(30) Priority: **25.07.2016 IT 201600077946**

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(54) **AN APPARATUS AND A METHOD FOR UNPACKING FOOD PRODUCTS**

(57) A method for unpacking a food product contained in a substantially parallelepiped pack (10).

The method comprises the steps of:

- cutting a side (13) of the pack by placing said side (13) in contact with cutting means (30);

- causing the product to fall into an opening (7), at the same time retaining the pack (10).

The step of causing the product to fall into the opening (7) includes causing the product to exit from the pack (10) through said side (13).

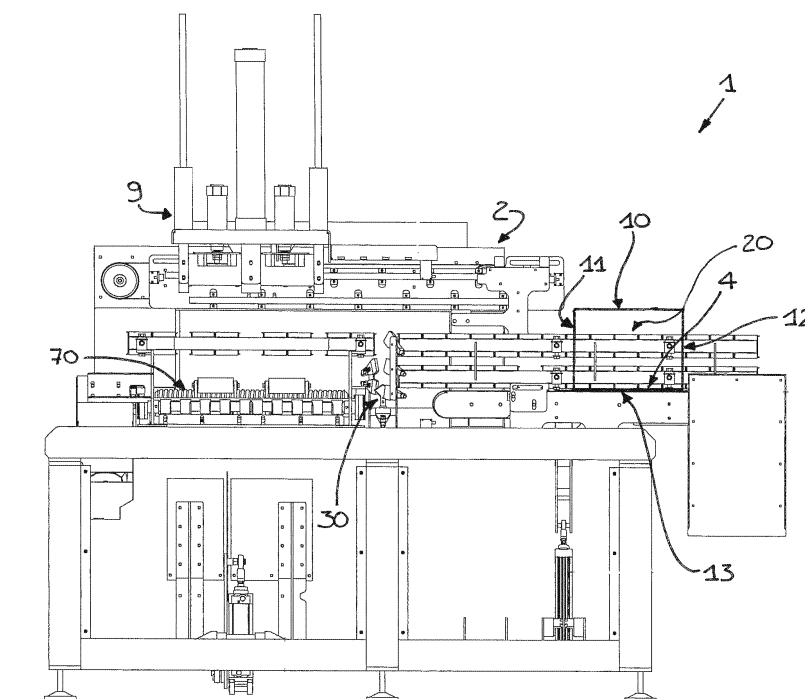


Fig. 1

Description

[0001] The present invention relates to an apparatus and a method for unpacking food products. These are used for removing a food product located internally of a pack. Purely by way of example, the product might be a curd pat, but also vegetables and others besides.

[0002] At present, for unpacking products the operator has to lift a pack, load it on an advancement line and cut it with a cutter and remove the contents. A drawback of this solution is connected to the fact that the operator has to move a pack and its contents by hand. Considering the weight that the packs can reach when full, this task can be laborious and carry an injury risk. Further, the use of personnel makes the operation particularly expensive.

[0003] In this context, the technical task that is the basis of the present invention is to disclose an apparatus and a method to unpack food products that obviate the drawbacks of the above-cited prior art.

[0004] In particular an important aim of the present invention is to unpack the product while reducing the labour and risk of injury that operators could suffer.

[0005] The stated technical task and specified objects are substantially achieved by an apparatus and a method for unpacking, comprising the technical features disclosed in one or more of the appended claims.

[0006] Further characteristics and advantages of the present invention will become more apparent from the approximate and thus non-limiting description of a preferred, but not exclusive, embodiment of an apparatus for unpacking, as illustrated in the accompanying drawings, in which:

- figure 1 shows a lateral view of an apparatus according to the present invention;
- figure 2 is an enlargement of figure 1;
- figure 3 shows a detail of a component illustrated in figure 1;
- figure 4 is a plan view of the apparatus of figure 1;
- figure 5 shows a detail of a component illustrated in figure 4;
- figures 6 and 7 show details of the apparatus of figure 1.

[0007] In the accompanying drawings, reference numeral 1 denotes an unpacking apparatus for food products. The food products might be curd pats, but also vegetables and others besides.

[0008] The apparatus 1 comprises resting means 4 of a pack. They are located along a first portion 20 of the apparatus 1. The apparatus 1 further comprises a blade 3 which assumes a first configuration in which it projects above the resting means 4. The resting means 4 can for example comprise a conveyor belt and/or a roller belt with preferably idle rollers. The apparatus 1 further comprises relative movement means of the blade-pack for the purpose of carrying out a cutting of the pack. In particular, the blade-pack moving means comprise advancing

means 2 of a pack along the first portion 20. The blade 3 preferably does not move horizontally. The apparatus 1 advantageously comprises a tilting device 8 of a pack; the device 8 is located upstream of the blade 3. In this way, a pack can be horizontally rested by a user and thereafter the device 8 vertically tilts the pack. The device 8 advantageously comprises a tiltable roller plane. The roller plane can therefore be horizontally positioned and can tilt upwards. Figure 4 shows a plan view in which the roller plane is horizontal and figure 5 is a view in which the roller plane is vertically tilted.

[0009] In the preferred embodiment, the advancing means 2 comprise lateral hooking means 21 of a pack.

[0010] The advancing means 2 advantageously comprise translating means 22 of said hooking means 21.

[0011] The lateral hooking means 21 comprise a toothed support that hooks the pack and the contents thereof. The translating means 22 can comprise a kinematic mechanism and a belt moved by a pair of pulleys which determines the horizontal translation of the hooking means 21.

[0012] The apparatus 1 advantageously comprises raising and/or lowering means of the blade 3 for cutting at least a vertical flank (preferably two vertical flanks) of a pack to be opened.

[0013] For this purpose, the apparatus 1 comprises synchronising means of the raising and/or lowering of the blade 3 and of the advancing means 2 of a pack. The synchronising means can advantageously comprise a photocell which signals the passage of the pack at predetermined points.

[0014] As shown by way of example in figure 2, the blade 3 advantageously comprises at least three tips orientated along three different directions (preferably one orientated upwards and two orientated in opposite directions). The blade 3 is preferably shaped as a rhombus or a quadrilateral body having a vertex constrained to a raising/lowering rod. The apparatus 1 further comprises an opening 7 for descent of a food product located in a pack. The opening 7 is advantageously located downstream of said blade 3. Retaining means 70 of a pack are also present. The retaining means 70 contrast the descent of the pack in said opening 7, at least in an operating mode. In this way, the product contained internally of the pack exits by force of gravity while the pack is retained.

[0015] The retaining means 70 comprise a friction surface 700 made of rubber. The retaining means 70 preferably comprise two opposite friction surfaces 700 made of rubber. The retaining means 70 preferably comprise a rubber roller or, better, a pair of opposite rollers (figure 4 illustrates a pair of rollers that move away from each other to define the opening 7).

[0016] The opposing pair of rollers of the retaining means 70 is constituted by a first and a second roller 701, 702.

[0017] The opening 7 is located between the first and the second roller 701, 702. The first and the second roll-

ers 701, 702 are counter-rotating. In a first operating mode the first and second rollers rotate such that the portions intended to come into contact with the pack exert a force that contrasts the force of gravity. In this way, the first and second rollers are able to retain the pack while the product falls into the opening. In a second operating mode the first and second rollers rotate in opposite direction so that the pack, by now separated from the product, can also fall into the opening 7. Two guide rollers, which are advantageously idle, might be located below the opposing rollers. The two opposite surfaces 700 are advantageously located at said opening 7. The two opposite surfaces 700 are advantageously grooved. This reduces the risk of sliding of a pack having condensation or liquid on a surface thereof.

[0018] The apparatus 1 advantageously comprises pushing means 9 for pushing the pack into the underlying opening 7. The pushing means 9 appropriately comprise a first pusher 91 which moves downwards for a predetermined travel and at least a second pusher 92 which moves downwards for an additional travel (advantageously there is also a third pusher 93 which operates alike to the second pusher 92). The second pusher 92 projects from the first pusher 91. The second pusher 92 has a pushing surface that is smaller than that of the first pusher 91, considered as a whole. This enables to move the first pusher 91 downwards without the risk of coming into contact with the retaining means 70 (ruining them). Thereafter the second pusher 92 causes an additional downwards travel, which second pusher 92, being smaller, does not run the risk of coming into contact with the retaining means 70.

[0019] The pushing means 9 is movable along an advancement path of the pack so as to be able to push the pack and the contents thereof against the underlying blade 3.

[0020] The apparatus 1 further comprises removing means 71 of a pack comprising blowing means 72 located at said retaining means 70 of a pack. The blowing means 72 direct a pressurised jet towards the empty pack which is then pushed into a disposal zone.

[0021] The apparatus 1 further comprises a product movement line which falls through said opening 7. The movement line transits below the opening 7. Advantageously, but not necessarily, cutting elements of the product (for example butter or curd pats) can be present along the movement line.

[0022] The apparatus 1 comprises a tank of pressurised air for activating the blowing means 72 (and advantageously also further blowing elements for cleaning the apparatus 1). The tank is independent from a further reserve/source of pressurised fluid which is destined to supply a movement piston of the blade 3 and/or a piston of the tilting device 8 and possibly also other pistons of the apparatus 1.

[0023] The present invention further relates to a method for unpacking a food product contained in a substantially parallelepiped pack 10. This method can be imple-

mented by an apparatus 1 having one or more of the features described previously.

[0024] The method comprises the step of cutting a side 13 of the pack. The side is advantageously substantially horizontal. This occurs by placing said substantially horizontal side 13 in contact with cutting means 30. The cutting means 30 comprise a blade 3. The step of cutting a substantially horizontal side 13 takes place while keeping the cutting means 30 stationary and advancing the pack. The substantially horizontal side 13 is a side of the pack that is arranged inferiorly.

[0025] The method further advantageously comprises a step of at least partly (preferably entirely) cutting a substantially vertical first flank 11 of the pack 10. The method further comprises a step of at least partly (preferably entirely) cutting a substantially vertical second flank 12 of the pack 10. The cutting of the vertical sides enables having an outlet opening of the product from the pack that is easier and thus facilitates the exit of the product.

[0026] The step of cutting a substantially horizontal side 13 and the steps of cutting a substantially vertical first and second flank 11, 12 are done using the same blade 3.

[0027] The step of at least partly cutting the first vertical flank 11 of the pack comprises the sub-steps of:

- positioning the first flank 11 to be cut on the cutting means 30; this is appropriately achieved by moving the pack and the contents thereof without horizontally displacing the cutting means 30;
- vertically raising the cutting means 30 cutting the first vertical flank 11. The step of at least partly cutting the second vertical flank 12 of the pack 10 comprises the sub-steps of:
- positioning the second flank 12 to be cut on the cutting means 30; this is appropriately achieved by moving the pack and the contents thereof without horizontally displacing the cutting means 30;
- vertically raising the cutting means 30, cutting the second vertical flank 12.

[0028] The step of cutting a substantially vertical first flank 11 of the pack 10 takes place before the step of cutting a substantially horizontal side 13 of the pack 10, which in turn takes place before the step of cutting the substantially vertical second flank 12 of the pack 10.

[0029] The method further comprises a step of causing the product to fall into an opening 7, at the same time retaining the pack 10. The opening 7 is downstream of the blade 3. The product exits from the pack 10 through the previously-cut substantially horizontal side 13. Thus, the product falls downwards by force of gravity. It is then moved by an underlying movement line.

[0030] The step of retaining the pack 10 includes placing the pack 10 in contact with at least a friction surface 700 that contrasts the downwards fall of the pack 10. The step of retaining the pack 10 preferably includes retaining two opposite faces of the pack which vertically extend

between the first and the second flank 11, 12. This includes placing the faces in contact with corresponding opposite friction surfaces 700. The friction surfaces 700 are located at the opening 7.

[0031] The step of retaining the pack 10 includes causing the product to transit with the pack between a counter-rotating first and a second roller 701, 702. The counter-rotating rollers 701, 702 perform an action that contrasts the passage of the pack 10, enabling exit and passage of the product. The pack 10 is then retained by the counter-rotating rollers 701, 702. Following the extraction of the product from the pack, the first and the second roller 701, 702 invert the sense of rotation for facilitating the passage of the empty pack 10 through the opening 7.

[0032] The method further includes directing a jet of compressed air towards the pack after the product has exited. In this case the pack 10 is advantageously located below the opening 7. The step of directing the jet of compressed air against the pack determines the removal thereof. The pack is advantageously pushed by the jet of air into a storage zone which is periodically emptied.

[0033] The invention as it is conceived enables achieving multiple advantages. First it enables complete mechanisation of the unpacking operation of pats of food products. This enables using the personnel in less laborious operations from the physical point of view without penalising the quality of work.

[0034] The invention as it is conceived is susceptible to numerous modifications, all falling within the scope of the inventive concept characterising it. Further, all the details can be replaced with other technically-equivalent elements. In practice, all the materials used, as well as the dimensions, can be any according to requirements.

Claims

1. An apparatus for unpacking food products comprising:

- resting means (4) of a pack;
- a blade (3) which assumes a first configuration in which it projects above the resting means (4) on which the pack is positioned;
- blade-pack relative displacing means for cutting the pack;
- an opening (7) for descent of a food product located in a pack, said opening being located downstream of the blade (3);
- retaining means (70) of a pack that, at least in a first operative mode, contrast the descent of the pack in said opening (7).

2. The apparatus according to claim 1, **characterised in that** the blade-pack relative displacing means comprise advancing means (2) of a pack, said apparatus comprising:

- raising and/or lowering means of the blade (3) for cutting at least a vertical flank of a pack to be opened;
- synchronising means (6) of the raising and/or lowering of the blade (3) and/or the advancing means (2) of a pack.

3. The apparatus according to claim 2, **characterised in that** the advancing means (2) comprise:

- lateral hooking means (21) of a pack;
- translating means (22) of said hooking means (21).

4. The apparatus according to any one of the preceding claims, **characterised in that** the retaining means (70) comprise a friction surface (700) made of a grooved rubber.

5. The apparatus according to any one of the preceding claims, **characterised in that** it comprises removing means (71) of a pack comprising blowing means (72) which direct at least a jet of pressurised fluid against the empty pack, said blowing means (72) being located at said retaining means (70) of a pack.

6. The apparatus according to any one of the preceding claims, **characterised in that** it comprises a presser (9) for pushing downwards the pack.

7. A method for unpacking a food product contained in a substantially parallelepiped pack (10), said method comprising the steps of:

- cutting a side (13) of the pack by placing said side (13) in contact with cutting means (30);
- causing the product to fall into an opening (7), at the same time retaining the pack (10), the step of causing the product to fall into the opening (7) including causing the product to exit from the pack (10) through said side (13).

8. The method according to claim 7, **characterised in that** it comprises the steps of:

- at least partly cutting a substantially vertical first flank (11) of the pack (10);
- at least partly cutting a substantially vertical second flank (12) of the pack (10);

the step of cutting a side (13) of the pack taking place while keeping the cutting means (30) stationary and advancing the pack, said side (13) being a substantially horizontal side of the pack arranged inferiorly; the step of cutting a substantially horizontal side (13) and the steps of cutting a substantially vertical first and second flank (11, 12) being done using the same blade (3).

9. The method according to claim 8, **characterised in that** the step of at least partly cutting the first vertical flank (11) of the pack comprises the sub-steps of:

- moving the pack and positioning the first flank (11) to be cut against the cutting means (30) without horizontally displacing the cutting means (30); 5
- vertically moving the cutting means (30) cutting the first vertical flank (11); the step of at least partly cutting the second vertical flank (12) of the pack (10) comprises the sub-steps of: 10
- moving the pack and positioning the second flank (12) to be cut on the cutting means (30) without horizontally displacing the cutting means (30); 15
- vertically raising the cutting means (30) cutting the second vertical flank (12);

the step of cutting a substantially vertical first flank (11) of the pack (10) taking place before the step of cutting a substantially horizontal side (13) of the pack (10); the step of cutting a substantially horizontal side (13) of the pack (10) in turn taking place before the step of cutting the substantially vertical second flank (12) of the pack (10). 20 25

10. The method according to claim 7 or 8 or 9, **characterised in that** the step of retaining the pack (10) includes placing the pack (10) in contact with at least a pair of friction surfaces (700) opposite to each other that contrast the downwards fall of the pack (10). 30

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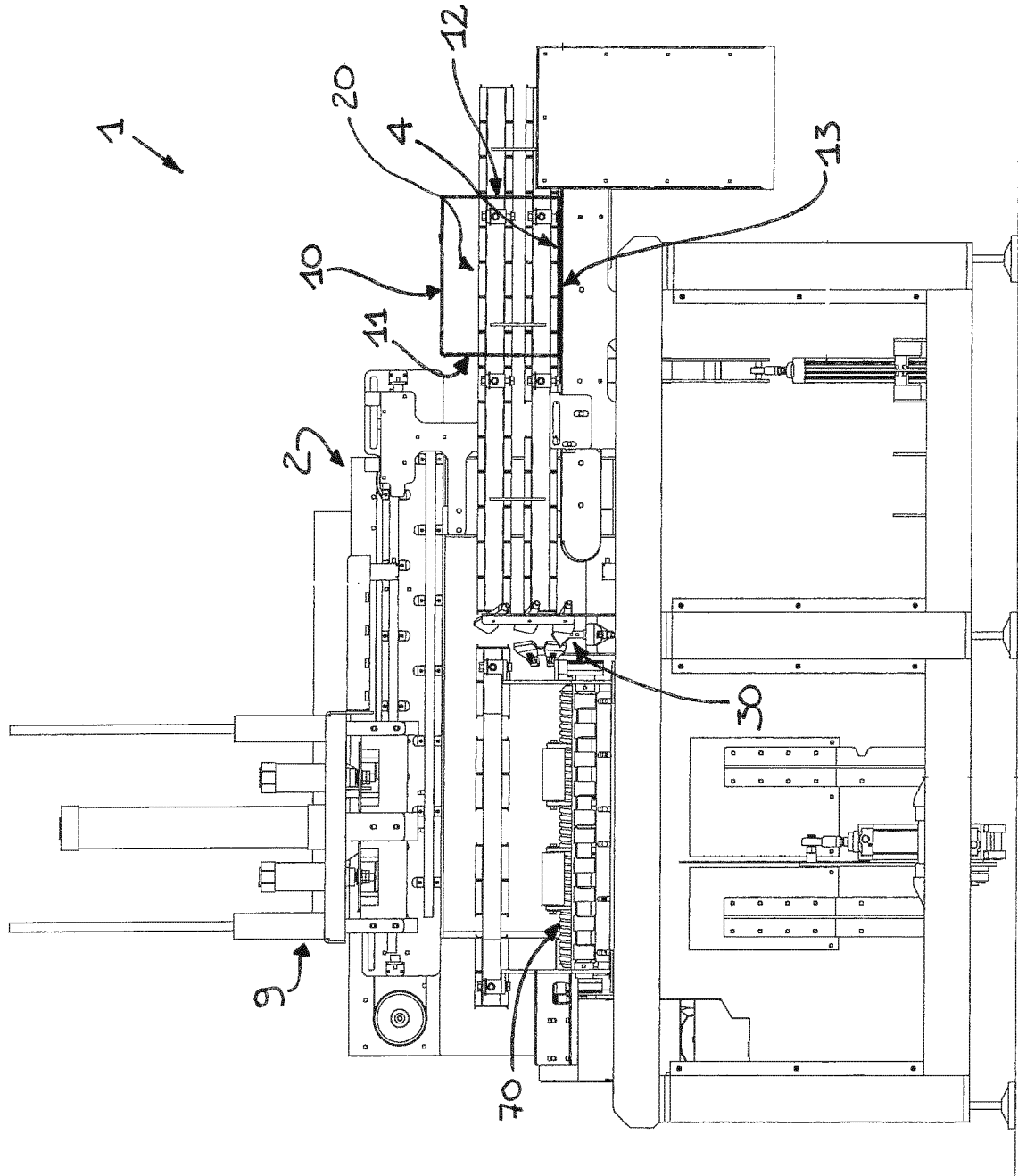


Fig. 1

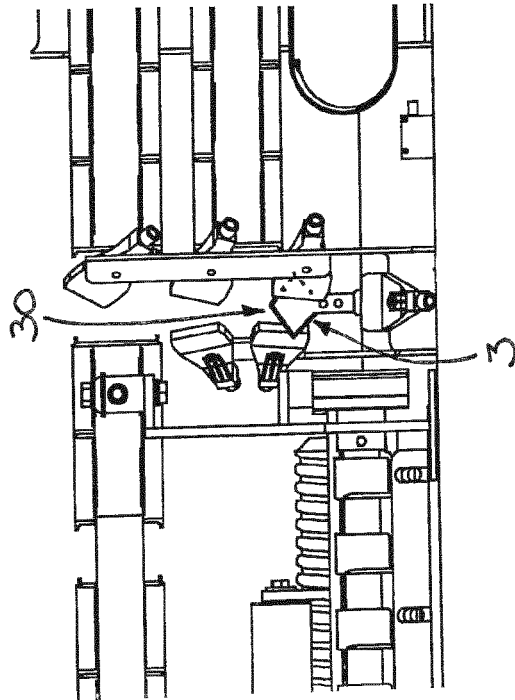


Fig. 2

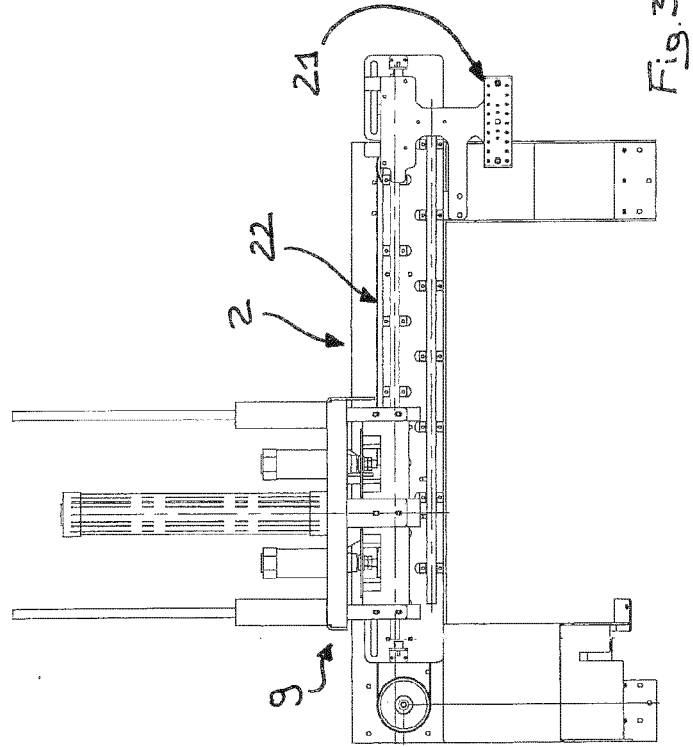
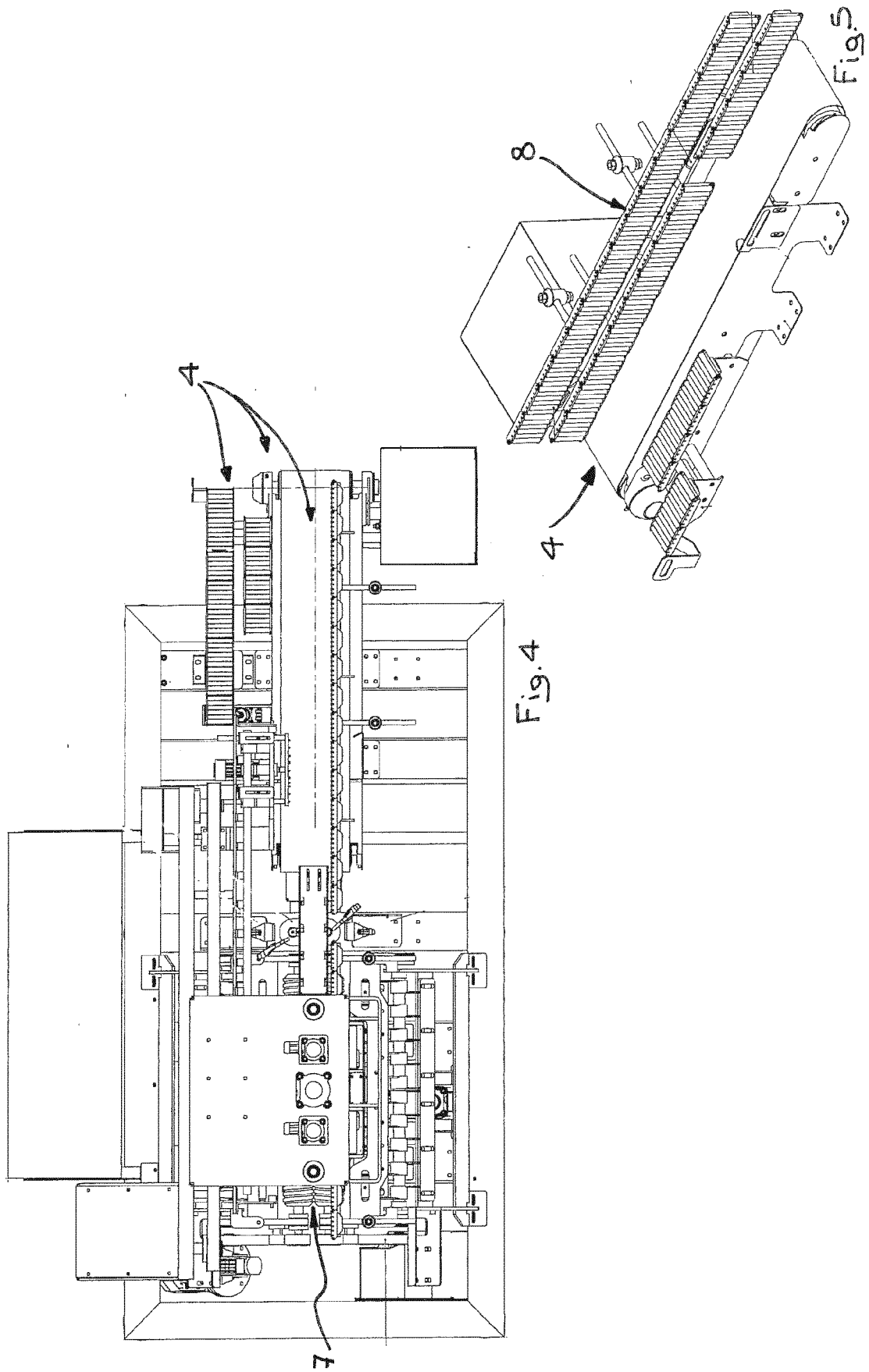


Fig. 3



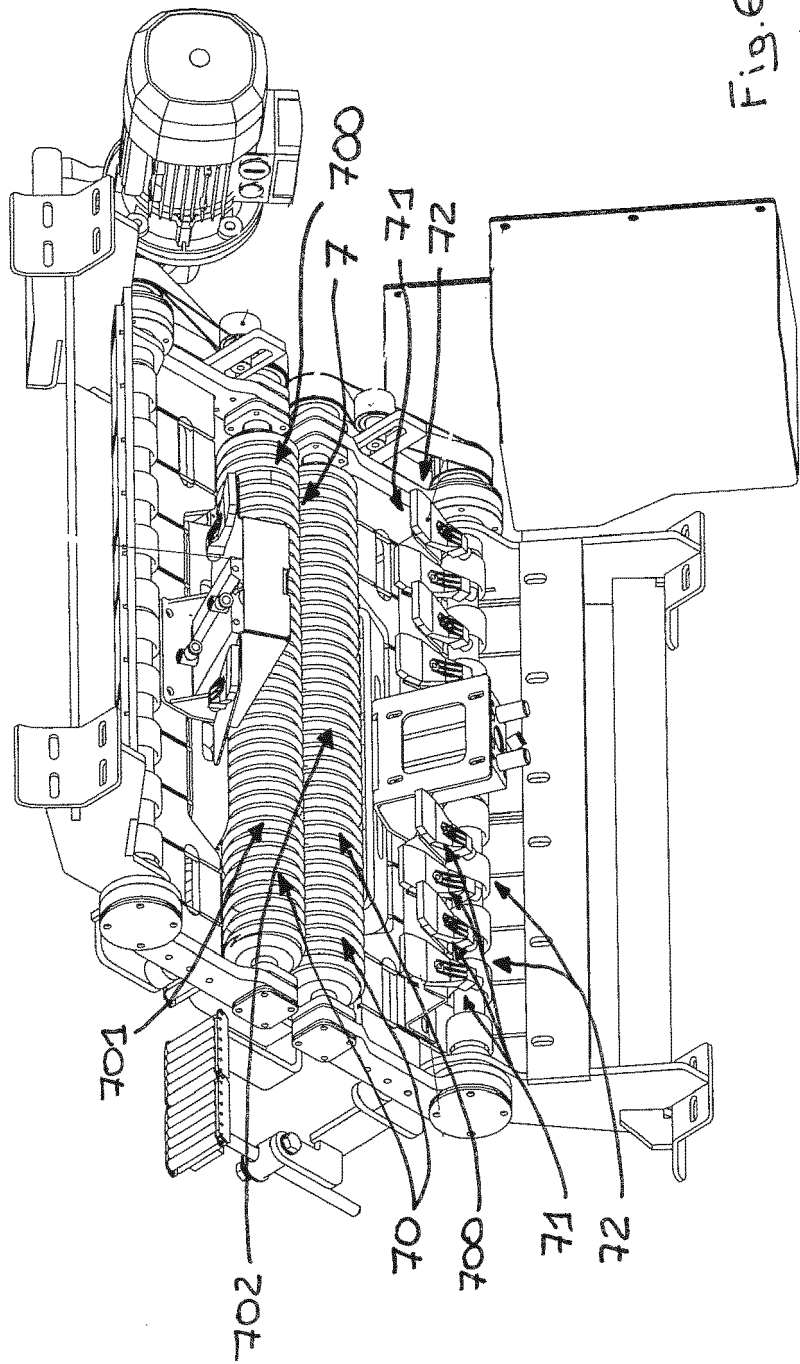
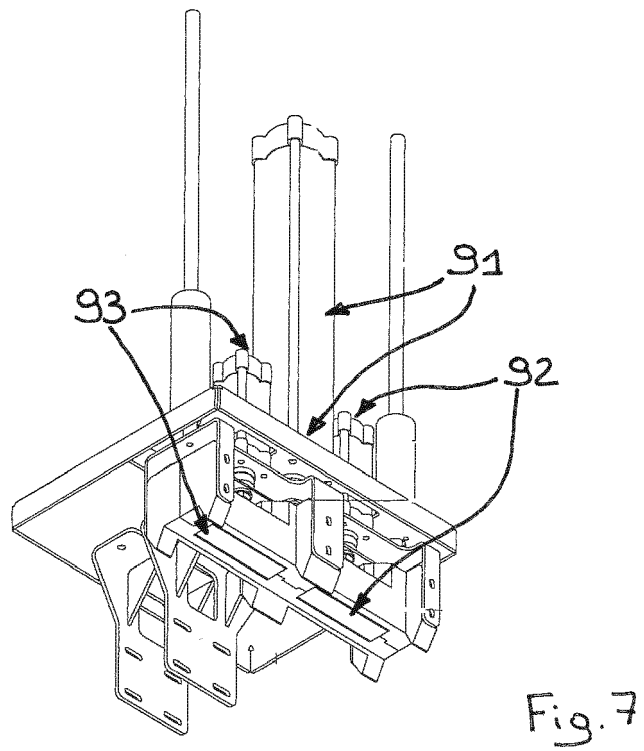


Fig. 6





EUROPEAN SEARCH REPORT

Application Number
EP 17 18 2156

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 4 207 021 A (BURDETT HARRY W JR [US]) 10 June 1980 (1980-06-10)	1,4-7	INV. B65B69/00
Y	* column 1, lines 15-21 *	2,3,8	B26D1/02
A	* column 2, lines 45-47 * * column 3, line 13 - column 4, line 68 * * column 7, line 14 - column 10, line 63; figures 1-16 * * column 13, line 61 - column 15, line 5; figures 23-26 *	9,10	B26D1/04
X	EP 2 714 527 A1 (LUXME HOLDING INC [CA]) 9 April 2014 (2014-04-09)	1,7	
A	* paragraphs [0008] - [0048]; figures 1-6 *	2-6,8-10	
X	GB 1 105 006 A (GRUN KG FA GEB) 6 March 1968 (1968-03-06)	1,7	
A	* the whole document *	2-6,8-10	
Y	JP H08 11849 A (HITACHI PLANT ENG & CONSTR CO) 16 January 1996 (1996-01-16)	2,3,8	
A	* paragraphs [0006] - [0011]; figure 1 *	1,7	TECHNICAL FIELDS SEARCHED (IPC)
A	FR 3 002 467 A1 (SECMIL [FR]; VEOLIA PROPRETE LIMOUSIN [FR]) 29 August 2014 (2014-08-29) * figures 3-6 *	1,2,7,8	B65B B26D
A	US 2013/152345 A1 (BROWN JOE GOODWIN [US]) 20 June 2013 (2013-06-20) * figures 2,3 *	1,2,7,8	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 4 September 2017	Examiner Cardoso, Victor
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			

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 18 2156

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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04-09-2017

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4207021 A	10-06-1980	NONE	
EP 2714527 A1	09-04-2014	CA 2741247 A1 EP 2714527 A1 WO 2012162793 A1	27-11-2012 09-04-2014 06-12-2012
GB 1105006 A	06-03-1968	NONE	
JP H0811849 A	16-01-1996	NONE	
FR 3002467 A1	29-08-2014	NONE	
US 2013152345 A1	20-06-2013	NONE	

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