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(71) Applicant: **Macs S.r.l.**
40122 Bologna (IT)

(72) Inventor: **MARCHIONI, Francesco**
40136 BOLOGNA (IT)

(74) Representative: **Modiano, Micaela Nadia**
Modiano & Partners
Via Meravigli, 16
20123 Milano (IT)

(54) **MODULAR PACKAGING APPARATUS**

(57) A modular packaging apparatus (1) for providing packages of the type known as Doypack (A), which comprises: at least one first independent and separate station (2) for forming pouches (B), which is provided with at least one reel (C) of polymeric film (D), with at least one assembly (3) for folding and coupling flaps of the film (D), at least one track (4) for the support, even just in localized regions, of a continuous planar lamina (E) of layers of film (D), and at least one cutting unit (5) for dividing the

planar lamina (E) into pouches (B); at least one second independent and separate station (7) for the filling and closing of the pouches (B); at least one element for the pickup and transfer of at least one individual pouch (B) from the at least one track (4) to at least one entry stage (8) for the pouches (B) of the second station (7), the at least one pickup element being interposed between the at least one track (4) and the second filling and closing station (7).

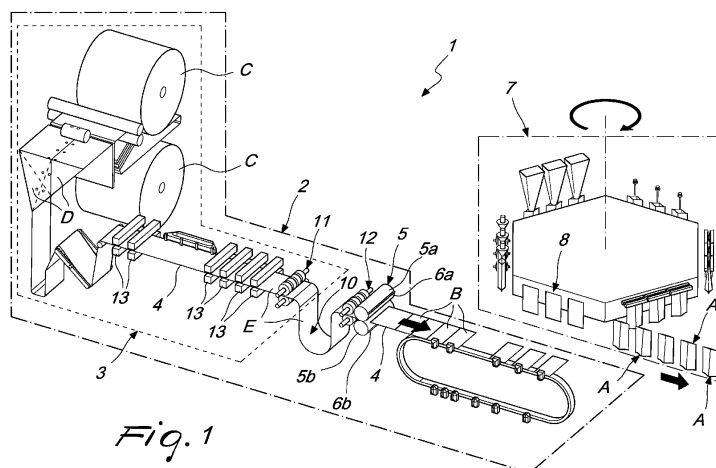


Fig. 1

Description

[0001] The present invention relates to a modular packaging apparatus of the type suitable to create packages of the type known as Doypack, i.e., pouches suitable to remain in the vertical position (upright). The apparatus according to the invention can also provide quad-seal packages (of the type known in the field as "sachet") or other specific three-seal packages (of the type known in the field as "3SS") or of the pillow type (of the type known in the field as "stabilo"). The type of packaging known as Doypack is constituted by a preformed pouch which supports itself by means of a bottom which keeps it in shape and in upright position: it is generally constituted by a single film (and, in some special cases, by two independent films) which is sealed with mutually opposite faces so as to form a stable bottom, which also gives greater capacity to the package.

[0002] Machines of the known type which provide this type of package provide for the formation of the pouch, its filling with a specific product, and its closure.

[0003] In order to meet the typical productivity requirements of the field, large monoblock machines are generally used which perform all the processes starting from the reels of polymeric film up to the delivery of the complete package.

[0004] These large machines operate by following a common and single rule of motion and therefore all the stations that compose them operate synchronously.

[0005] Obviously, the maximum production speed obtainable for the entire machine corresponds to the maximum speed of the slowest station, with respect to which all the other stations must be adjusted.

[0006] The type of operations to be performed in monoblock machines of the known type, furthermore, forces the use of a formation and transfer of each pouch in a vertical arrangement, so that it remains substantially suspended from a conveyance line and is constantly subjected to its own weight.

[0007] The fact that the pouch is subjected to its own weight during all the processing step entails the possibility that small deformations might occur which, in some cases, may be permanent, producing poor quality of some packages. Difficulty in keeping the film in motion in a horizontal constant position, which can be obtained only by inserting complicated direction control systems which increase the costs of the machine and make its control difficult, should also be noted.

[0008] The aim of the present invention is to solve the problems described above, providing a modular packaging apparatus which divides the operating stations into individual independent modules.

[0009] Within this aim, an object of the invention is to provide a modular packaging apparatus in which the individual modules that compose it can operate according to a rule of motion of their own which is substantially independent of that of the other modules.

[0010] Another object of the invention is to provide a

modular packaging apparatus in which the individual modules that compose it can operate according to a production speed of their own which is substantially independent of the speed of the other modules.

[0011] Another object of the invention is to provide a modular packaging apparatus that prevents the formation of badly cut pouches due to the effect of the polymeric film's own weight, retained with a suspended arrangement during the formation of the pouches.

[0012] Another object of the invention is to provide a modular packaging apparatus that can be laid out according to various configurations, by virtue of its modularity and versatility, allowing also to be reconfigured if needed.

[0013] Another object of the invention is to provide a modular packaging apparatus that can be modified in order to increase productivity.

[0014] Another object of the invention is to provide a modular packaging apparatus that keeps the film in motion in a horizontal constant position.

[0015] A further object of the present invention is to provide a modular packaging apparatus that has a low cost, is relatively simple to provide in practice and is safe in application.

[0016] This aim and these objects, as well as others which will become better apparent hereinafter, are achieved by a modular packaging apparatus for providing packages of the type known as Doypack, characterized in that it comprises

- at least one first independent and separate station for forming pouches, which is provided with at least one reel of polymeric film, with at least one assembly for folding and coupling flaps of said film, at least one track for the support, even just in localized regions, of a continuous planar lamina of layers of film which are folded and locally coupled, arranged so as to rest with one of its faces on at least one region of said track, and at least one cutting unit for dividing said planar lamina into pouches;
- at least one second independent and separate station for the filling and closing of said pouches;
- at least one element for the pickup and transfer of at least one individual pouch from said at least one track to at least one stage for the entry of said pouches of said second station for filling and closing said pouches, said at least one pickup element being interposed between said at least one track and said second filling and closing station.

[0017] Further characteristics and advantages of the invention will become better apparent from the description of a preferred but not exclusive embodiment of the modular packaging apparatus, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a schematic perspective view of a possible embodiment of a modular packaging apparatus

according to the invention;

Figure 2 is a schematic perspective view of a further embodiment of a modular packaging apparatus according to the invention;

Figure 3 is a schematic perspective view of another embodiment of a modular packaging apparatus according to the invention.

[0018] With reference to the figures, the reference numeral 1 generally designates a modular packaging apparatus for providing packages A of the type known as Doypack.

[0019] The apparatus 1 according to the invention comprises at least one first independent and separate station 2 for forming pouches B.

[0020] The first station 2 is conveniently provided with at least one reel C of polymeric film D, with at least one assembly 3 for folding and coupling flaps of the film D, with at least one track 4 for the support, even just in localized regions, of a continuous planar lamina E of layers of film D which are folded and locally coupled: said planar lamina E is positively arranged so as to rest with one of its faces on at least one region of the track 4. The planar lamina E therefore advances along the track 4 with a horizontal arrangement of its mutually opposite planar faces.

[0021] The first station 2 furthermore comprises favorably at least one cutting unit 5 for dividing the planar lamina E into pouches B.

[0022] It is specified that the reels C of film D can be preferably two, so that the respective films can be superimposed, facilitating the operations for forming the planar lamina E.

[0023] The division of the planar lamina E into pouches B can be performed advantageously by using a cutting unit which comprises two mutually opposite rollers 5a, 5b. At least one of the rollers 5a, 5b comprises a blade 6a, 6b which protrudes from its surface. During the rotation of the respective roller 5a, 5b, each blade 6a, 6b abuts against the surface of the planar lamina E, performing the cut according to preset dimensional parameters.

[0024] The apparatus 1 according to the invention operates identically also with any other cutting system: in particular, variations with scissor-like cutting elements are possible, with fixed-blade cutting elements and with oscillating blade cutting elements. In any case, the adoption of further and different cutting elements as a function of each specific application for which the apparatus 1 is intended is not excluded.

[0025] The apparatus 1 according to the invention further comprises at least one second independent and separate station 7, which is designed to fill and close the pouches B in order to provide the packages A of the type known as Doypack.

[0026] The apparatus 1 according to the invention further comprises at least one element for picking up and transferring at least one individual pouch B from the at

least one track 4 to at least one stage 8 for the entry of the pouches B in the second station 7 for filling and closing them.

[0027] The at least one pickup element is interposed between the at least one track 4 and the second filling and closing station 7.

[0028] The pickup and transfer element is not shown in the accompanying figures since it is a generic handling device, of the type known generically as "pick and place", which can be chosen from any one of the commercial ones suitable to make each pouch B perform the desired trajectory.

[0029] With particular reference to an embodiment of unquestionable interest in practice and application, in the apparatus 1 according to the invention, between the at least one track 4 and the at least one entry stage 8 for the pouches B of the second filling and closing station 7 it is advantageously possible to interpose at least one accumulation magazine 9 (in practice a buffer) within which it is possible to store the pouches B that arrive from the first station 2.

[0030] By virtue of the presence of the accumulation magazine 9 it is possible to disconnect completely the first station 2 and the second station 7.

[0031] The first station 2 can in fact operate at any speed and with any rule of motion (continuous motion, intermittent motion, various motion): all the produced pouches B are stored in the magazine 9.

[0032] If the second station 7 performs the filling and closing operations by operating on a number of pouches per hour that is smaller than the hourly production of the first station 2, the magazine 9 would allow to accumulate pouches B, without the need to slow the first station 2. Optionally, at the end of production, it is possible to stop the first station 2 early and let the second station 7 proceed with the operations for filling and closing the pouches B until all the ones stored in the magazine are used up.

[0033] If instead it is the second station 7 that is faster (having a higher productivity in the unit time) than the first station 2, then it is possible to provide for an earlier start of the first station 2, so as to fill the magazine 9 as much as possible and start the second station only when the magazine 9 is full, ensuring regular operation in order to provide a predefined production. The continuous supply of pouches B from the first station 2 to the magazine 9 ensures that said magazine is emptied slowly, although this certainly will occur as a consequence of the higher production rate of the second station 7. In order to obviate any interruption of operation due to the lack of pouches B in the magazine 9, it is possible to fill the magazine 9 with pouches B provided previously, thus allowing the second station 7 to continue to operate with its own production rate.

[0034] The apparatus 1 according to the invention allows to work also with preformed pouches (which can be purchased commercially) fed from a respective magazine, leaving the station 2 inactive. This advantageously allows to use even shaped or special pouches which

couldn't be produced with the machine part 2.

[0035] It is specified furthermore that the at least one element for the pickup and transfer of at least one individual pouch B from the at least one track 4 to the at least one stage 8 for the entry of the pouches B in the second station 7 for filling and closing them comprises grip means which are orientable and can move to pick up at least one individual pouch B arranged horizontally on the track 4, rotate it through 90° and deliver it to the entry stage 8 with a vertical arrangement of the respective mutually opposite planar faces.

[0036] In practice, the pouches B (and the continuous planar lamina E) move while maintaining a substantially horizontal configuration along most of the first station 2, but move while maintaining a substantially vertical configuration along the second station 7.

[0037] The pickup and transfer element must therefore have grip means which can be oriented and moved in order to render the two stations 2 and 7 compatible; in particular, it must be able to modify the orientation of each individual pouch B in order to allow the pouches B provided by the first station 2 to be used by the second station 7.

[0038] It is specified furthermore that conveniently at least one component chosen from the at least one first station 2, the at least one second station 7, the at least one pickup and transfer element and the at least one accumulation magazine 9 is actuated by means of servomotors such as brushless motors, switching motors, linear induction motors, permanent magnet motors, switched-reluctance motors, and the like.

[0039] The adoption of controlled motors as actuation systems for all the moving parts of at least one of the previously listed components is extremely advantageous, since it allows great freedom in terms of adjustment, optimizing the operation of each individual component.

[0040] Normally, traditional machines use a number of main motors, which control numerous movable elements (with the interposition of cams, gear systems, belts, chains and other mechanical elements). This entails a great rigidity of the entire assembly of elements being moved, since any adjustment of the main motor affects all the components actuated by it.

[0041] By instead resorting to dedicated servomotors for each movable element, as provided in the components of the apparatus 1 according to the invention, it is possible to perform simple and efficient adjustments and select specific rules of motion as a function only of the requirements of that specific movable element, without these affecting the others. It is evident that by virtue of this great adjustment flexibility the apparatus 1 according to the invention is always optimized, since every component thereof can operate in the ideal operating conditions.

[0042] The servomotors can be conveniently functionally associated and controlled by a respective processing unit of the type chosen preferably from a programmable logic controller, an industrial computer, a personal com-

puter, a handheld computer, a remotely connected calculation device, and the like.

[0043] The processing unit may therefore interpolate the best operating configurations for each component and adjust them in order to obtain the maximum production efficiency of the entire apparatus 1.

[0044] By means of an interface element, the user can in any case check the operating conditions of each component and apply corrections, if one wishes to privilege specific operating parameters.

[0045] The first station 2 can favorably comprise a temporary accumulation area 10 (an intermediate buffer) designed to obtain a predefined reserve of the continuous planar lamina E arranged between the at least one folding and coupling assembly 3 and the at least one cutting unit 5.

[0046] In this temporary accumulation area 10, a portion of the planar lamina E is suspended between respective guiding means 11, 12 which are arranged upstream (the means 11) and downstream (the means 12): in this condition, it is subject to its own weight and curves by following substantially the shape of a hyperbolic plane curve such as a catenary.

[0047] The temporary accumulation area 10 allows to set the portion of planar lamina E that originates from the assembly 3 in phase with the operating speed of the cutting unit 5, behaving in practice as an intermediate buffer.

[0048] With particular reference to an embodiment of unquestionable interest, the apparatus 1 according to the invention can comprise advantageously at least two second independent and separate stations 7, each designed for the filling and closing of the pouches B.

[0049] In this case, at least one respective pickup and transfer element for each second station 7 that is present is interposed between the at least one track 4 and each second station 7.

[0050] This embodiment allows to fully utilize the productivity of the first station 2, sorting the pouches B produced by it on two separate second stations 7 which work simultaneously.

[0051] In this case, at least one respective accumulation magazine 9 can be arranged conveniently between each pickup and transfer element and the portion of the track 4 that faces it.

[0052] As an alternative, a single accumulation magazine 9, the length of which at least corresponds to the distance between the entry stages 8 of the respective second stations 7 measured along the direction of extension of the track 4, is arranged advantageously as an alternative between the pickup and transfer elements (one for each second station 7 that is present) and the portion of the track 4 that faces them.

[0053] Furthermore, it is pointed out that the folding and coupling assembly 3 comprises at least one sealing device 13 which can move along the advancement direction of the film D for the coupling by heat-sealing of the juxtaposed flaps (of the polymeric film D).

[0054] The movements of the at least one sealing unit

13, provided according to the respective degrees of freedom, ensure the simplicity of the format changing operations and allow the operation of said at least one sealing device 13 for the temporary chasing of the film D that advances with a continuous motion along the track 4 for respective sealing.

[0055] The mutual independence of the stations 2 and 7 is very important, since it allows high versatility of the apparatus 1 according to the invention, from a logistic standpoint (it can be installed according to the most convenient configuration as a function of the space available), from a production standpoint (each individual station 2, 7 can operate in maximum performance conditions and is not constrained to the operation of the other), from a malfunction management standpoint (the malfunction of one of the two stations in any case allows the other one to continue to produce, generating reserves of pouches B or using reserves of pouches to provide the packages A) and from a reconfigurability standpoint (an apparatus can be purchased with a single second station 7 and subsequently it is possible to purchase others to be arranged downstream or upstream thereof in order to increase productivity).

[0056] It should be noted that the second station 7 can also be purchased on its own, independently of the station 2, in order to be used with preformed pouches supplied by a respective magazine (it can be seen, therefore, that the apparatus 1 according to the invention and its components are particularly versatile). The end user has thus the future possibility to add the pouch forming station 2 when production volumes that justify this are reached.

[0057] The same principle can apply in relation to the variation of the configuration of the apparatus 1 according to the invention, which might comprise multiple forming stations 2 or multiple second stations 7 in order to adapt said apparatus 1 to the production requirements of the end user.

[0058] Advantageously, the present invention solves the problems described above, by providing the modular packaging apparatus 1 structured in such a manner as to divide the operating stations (the first station 2, the second station 3 and the accumulation magazine 9) into individual independent modules.

[0059] Each independent module can operate according to its own rules of motion and with a productivity that is independent of the other modules. The configurations of possible mutual coupling of the various modules are therefore multiple and not fixed, to the full benefit of the versatility of the apparatus 1.

[0060] Positively, the individual modules that compose the apparatus 1 according to the invention can operate according to an ideal rule of motion of their own, which is substantially independent of that of the other modules, ensuring optimization of the operating conditions.

[0061] Usefully, the individual modules that compose the apparatus 1 according to the invention can operate according to an ideal production rate of their own which is substantially independent of the rate of the other mod-

ules, ensuring optimization of the operating conditions.

[0062] Advantageously, the packaging apparatus 1 according to the invention avoids the formation of pouches that are not cut perfectly due to the deformation of the planar lamina caused by the effect of its weight: the continuous planar lamina E and the pouches B are in fact transferred horizontally along the track 4 and do not hang vertically as in traditional machines.

[0063] Conveniently, the packaging apparatus 1 according to the invention can be reconfigured, by virtue of its optimum versatility, even multiple times, modifying its layout due to logistic requirements and/or the number and characteristics of the modules that compose it due to production requirements.

[0064] Favorably, the packaging apparatus 1 according to the invention can be modified in order to increase productivity, increasing at will the number of the second stations 7 that operate therein.

[0065] Efficiently, the packaging apparatus 1 according to the invention is capable of keeping the planar lamina E in motion in a constant horizontal position.

[0066] It is specified that keeping the material in motion with a perfectly horizontal configuration and then cutting it according to a perfectly vertical trajectory is almost impossible to be provided with machines of the known type. The planar lamina E of film creates a bulge between the two points (traction rollers) between which it is locked in order to be unwound. This introduces the problem of controlling the horizontal motion of the film which, by tending to curve, does not maintain easily the horizontal arrangement during unwinding. In the apparatus 1 according to the invention, the material is unwound while leaving it always resting on the horizontal plane, which prevents deformations thereof due to gravity.

[0067] Validly, the packaging apparatus 1 according to the invention is relatively simple to provide in practice and has a low cost: these characteristics render the apparatus 1 according to the invention an innovation of assured practical application.

[0068] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the accompanying claims; all the details may furthermore be replaced with other technically equivalent elements.

[0069] In the exemplary embodiments shown, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other exemplary embodiments.

[0070] In practice, the materials used, as well as the dimensions, may be any according to the requirements and the state of the art.

[0071] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A modular packaging apparatus for providing packages of the type known as Doypack (A), **characterized in that** it comprises
 - at least one first independent and separate station (2) for forming pouches (B), which is provided with at least one reel (C) of polymeric film (D), with at least one assembly (3) for folding and coupling flaps of said film (D), at least one track (4) for the support, even just in localized regions, of a continuous planar lamina (E) of layers of film (D) which are folded and locally coupled, arranged so as to rest with one of its faces on at least one region of said track (4), and at least one cutting unit (5) for dividing said planar lamina (E) into pouches (B);
 - at least one second independent and separate station (7) for the filling and closing of said pouches (B);
 - at least one element for the pickup and transfer of at least one individual pouch (B) from said at least one track (4) to at least one stage (8) for the entry of said pouches (B) of said second station (7) for filling and closing said pouches (B), said at least one pickup element being interposed between said at least one track (4) and said second filling and closing station (7).
2. The apparatus according to claim 1, **characterized in that** at least one magazine (9) for the accumulation of pouches (B) is interposed between said at least one track (7) and said at least one entry stage (8) for said pouches (B) of said second filling and closing station (7).
3. The apparatus according to one or more of the preceding claims, **characterized in that** said at least one element for the pickup and transfer of at least one individual pouch (B) from said at least one track (4) to at least one entry stage (8) for said pouches (B) of said second station (7) for filling and closing said pouches (B) comprises grip means which are can be oriented and moved to pick up at least one individual pouch (B) arranged horizontally on said track (4), to rotate it through 90° and to deliver it to said entry stage (8) with a vertical arrangement of the respective mutually opposite planar faces.
4. The apparatus according to one or more of the preceding claims, **characterized in that** at least one component chosen from said at least one first station (2), said at least one second station (7), said at least one element for the pickup and transfer of at least one individual pouch (B) from said at least one track (4) to at least one entry stage (8) for said pouches (B) and said at least one accumulation magazine (9) is actuated by means of servomotors such as brushless motors, switching motors, linear induction motors, permanent magnet motors, switched-reluctance motors, and the like.
5. The apparatus according to claim 4, **characterized in that** said servomotors are functionally associated and controlled by a respective processing unit of the type chosen preferably from a programmable logic controller, an industrial computer, a personal computer, a handheld computer, a remotely connected calculation device, and the like.
6. The apparatus according to one or more of the preceding claims, **characterized in that** it comprises an area (10) for the temporary accumulation of said continuous planar lamina (E) of layers of film (D) which are folded and locally coupled, which is arranged between said at least one folding and coupling assembly (3) and said at least one cutting unit (5), in said temporary accumulation area (10) one portion of said planar lamina (E) being suspended between respective guiding means (11, 12), arranged upstream and downstream, and subjected to its own weight.
7. The apparatus according to one or more of the preceding claims, **characterized in that** it comprises at least two independent and separate second stations (7) for the filling and closing of said pouches (B), at least one respective pickup and transfer element being interposed between said at least one track (4) and each second station (7).
8. The apparatus according to the preceding claim, **characterized in that** at least one respective accumulation magazine (9) is arranged between each pickup and transfer element and the portion of said track (4) that faces it.
9. The apparatus according to claim 6 and as an alternative to claim 7, **characterized in that** a single accumulation magazine (9), the length of which at least corresponds to the distance between the entry stages (8) of the respective second stations (7), measured along the direction of extension of said track (4), is arranged between said pickup and transfer elements and the portion of said track (4) that faces it.
10. The apparatus, **characterized in that** said assembly (3) for the folding and coupling of flaps of said film (D) comprises at least one sealing device (13) which can move along the advancement direction of said film (D) for the coupling by heat-sealing of said juxtaposed polymeric film flaps (D), the movements of said at least one sealing device (13), provided according to the respective degrees of freedom, ensuring the change of format and the temporary chasing

of said film (D) for the sealing of the respective superimposed flaps during its translation.

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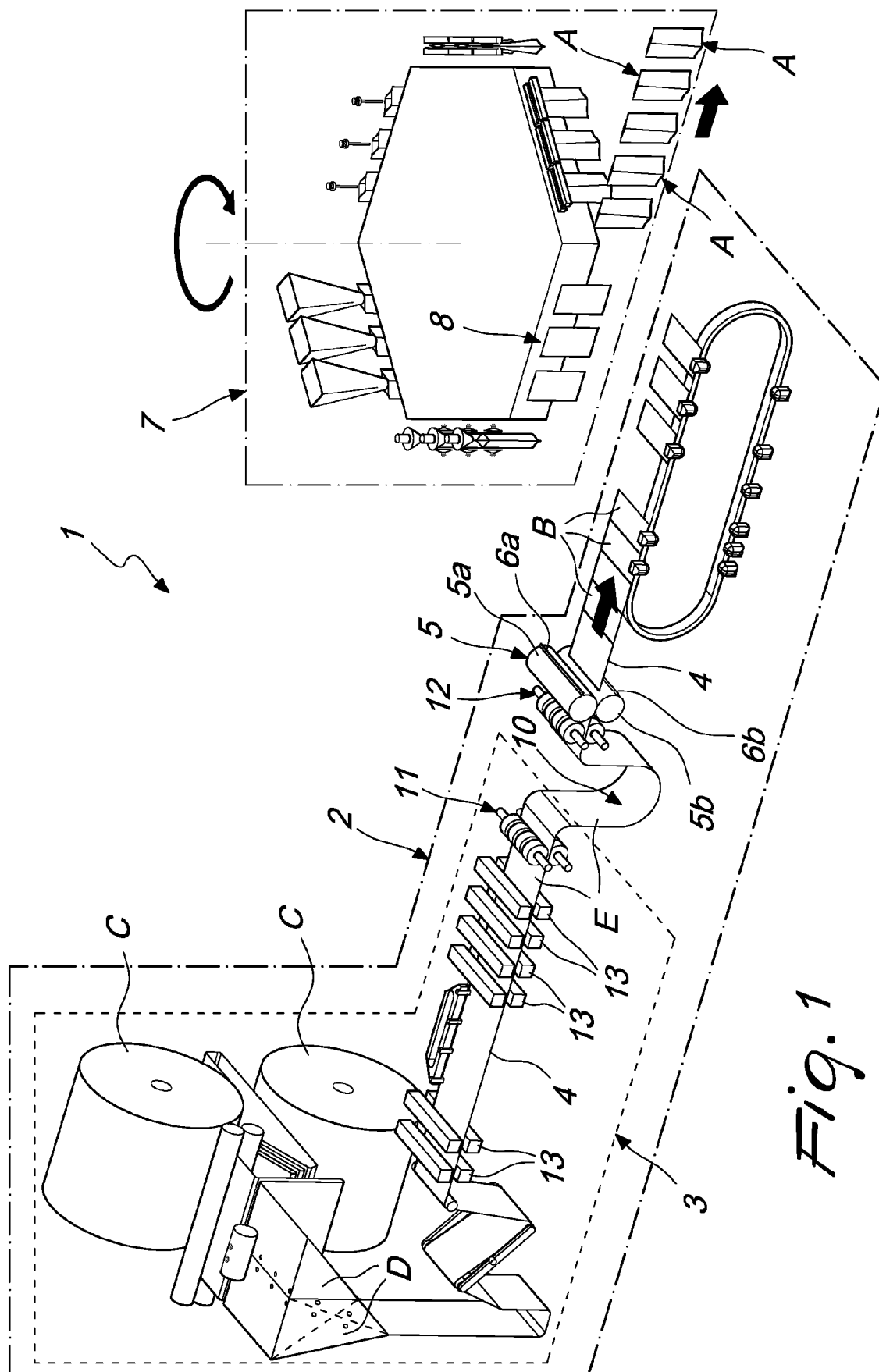
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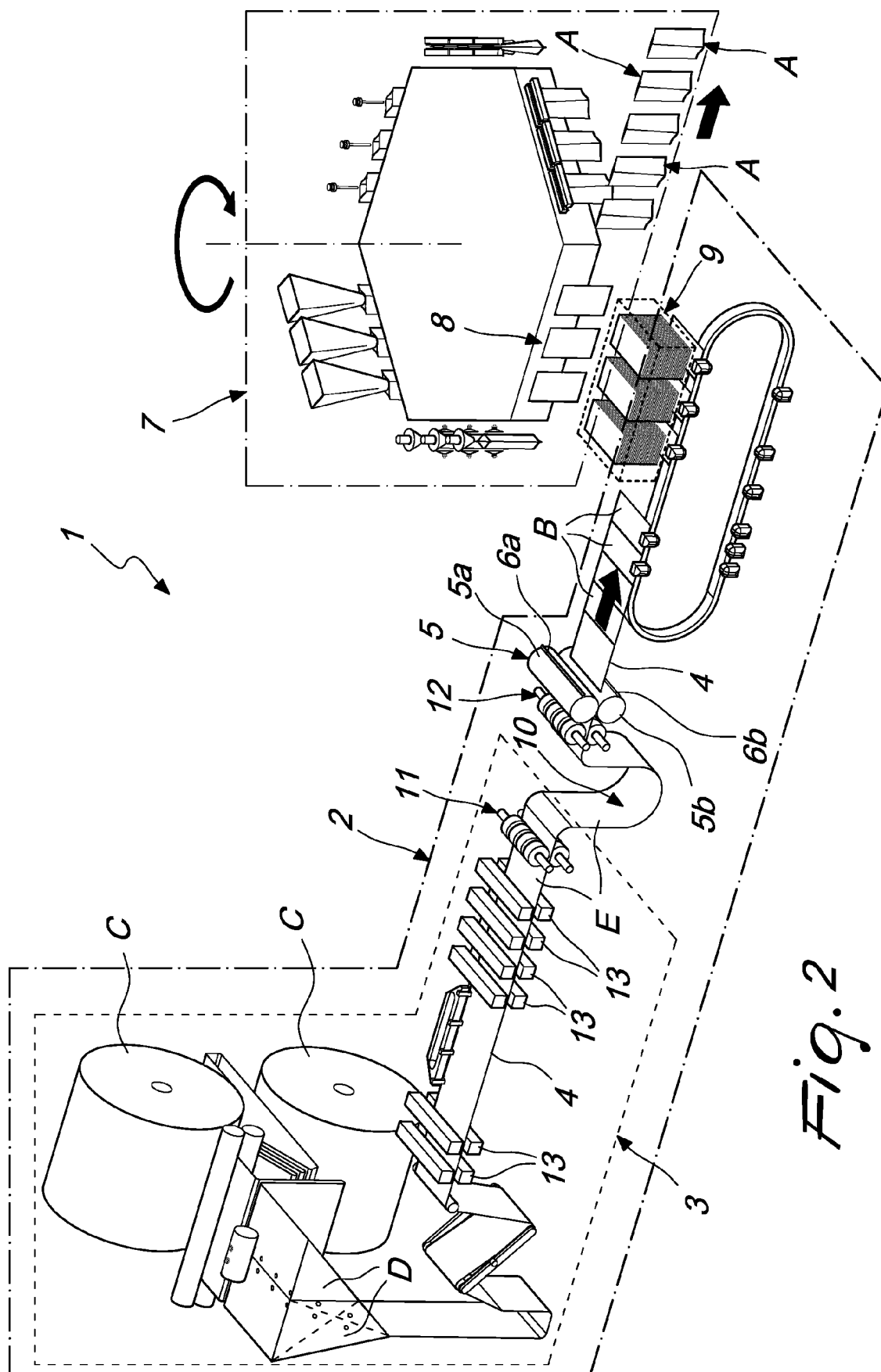
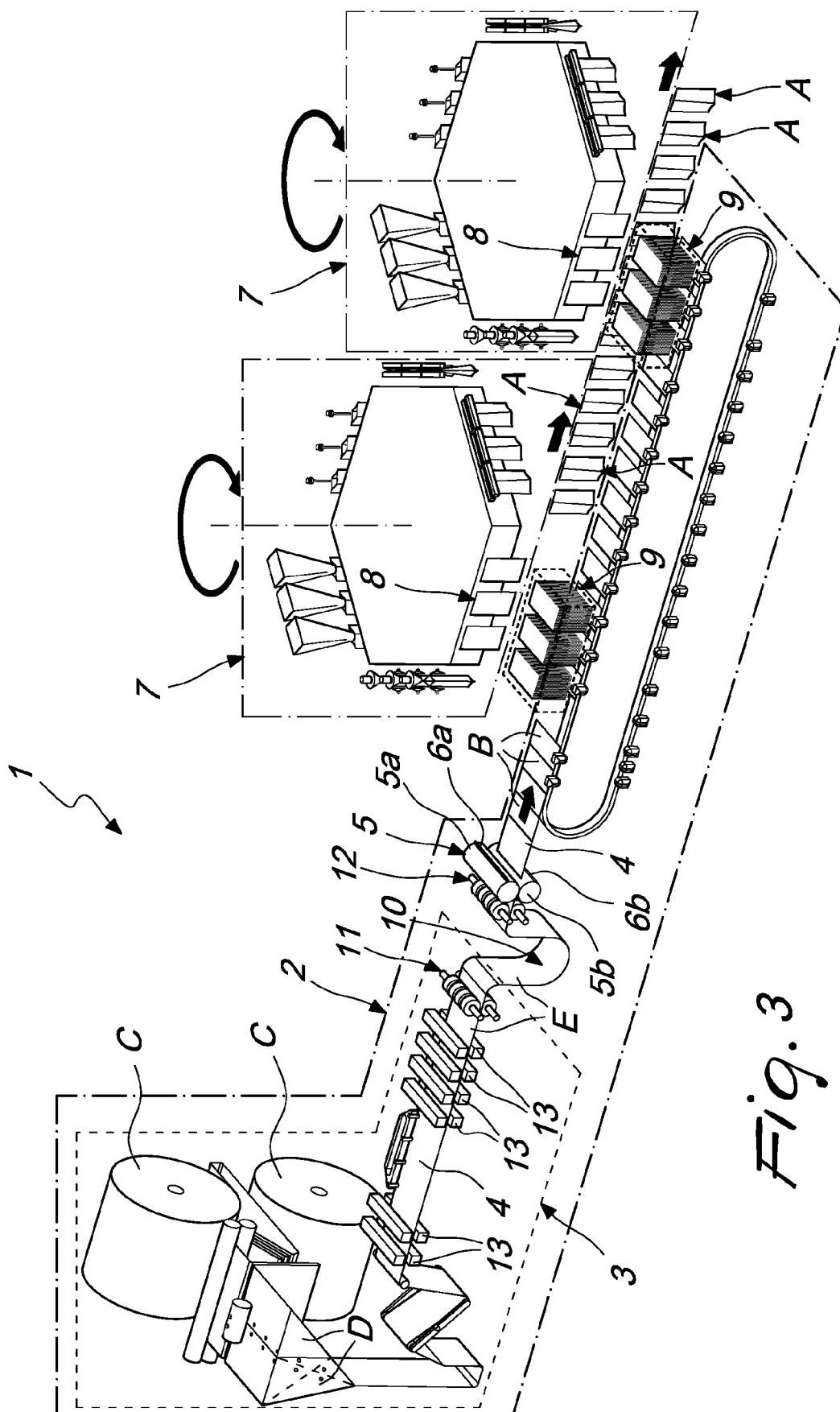


Fig. 2





EUROPEAN SEARCH REPORT

Application Number

EP 21 18 9395

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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 6 247 293 B1 (TODD JAMES E [US] ET AL) 19 June 2001 (2001-06-19)	1	INV. B65B65/00
Y	* see particularly passages cited in the opinion included in the EESR * -----	2	B31B70/26 B31B70/36 B31B70/64
X	US 2004/011001 A1 (HIRAMOTO SHINICHI [JP]) 22 January 2004 (2004-01-22)	1,2	B65H45/22 B65B9/02
Y	* see particularly passages cited in the opinion included in the EESR * -----	2	B65B9/08 B65B43/04 B65B43/14 B31B70/10 B31B70/98
			TECHNICAL FIELDS SEARCHED (IPC)
			B65B B31F B31B B65H
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 January 2022	Examiner Paetzke, Uwe
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	



Application Number

EP 21 18 9395

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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1, 2

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



LACK OF UNITY OF INVENTION SHEET B

Application Number

EP 21 18 9395

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1, 2

The additional features of claim 2 directed to the magazine for the accumulation of pouches interposed between the at least one track and the at least one entry stage, solve the problem to allow for a stand alone usage of the first or the second station.

2. claim: 3

The additional features of claim 3 directed to grip means solve the problem to provide a reliable transfer mechanism.

3. claims: 4, 5

The additional features of claims 4 and 5 directed to the actuation means of various components solve the problem to find suitable drives that allow for a controlled movement of the components.

4. claim: 6

The additional features of claim 6 directed to the slack of the web solve the problem to allow for precise sealing and cutting.

5. claims: 7-9

The features of claim 7 directed to multiple second stations solve the problem to create a redundancy for the function of the second station or to allow for utilizing the full capacity of the first station even when the second station has a lower capacity than the first station.

6. claim: 10

The additional features of claim 10 directed to the movable sealing devices solve the problem to allow for an easy format change.

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

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5 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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