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(54) **Method and machine for packaging products into two tubular bags**

(57) Method and machine for packaging products in which an inner tube (1) and an outer tube (2) of different diameters are generated, and the inner tube (1) is inserted into the outer tube (2). In a first sealing operation, the two tubes (1, 2) are attached to one another in a first sealing area, a semi-packet (300) which is closed at one end being obtained, the tubes (1, 2) are moved in a forward movement direction (A) and a product is deposited in the semi-packet (300). In a second sealing operation, the two tubes (1, 2) are attached to one another in a second sealing area and the two tubes (1, 2) are cut, a packet being obtained. The second sealing operation for generating a packet and the first sealing operation for generating the next semi-packet (300) are one and the same operation.

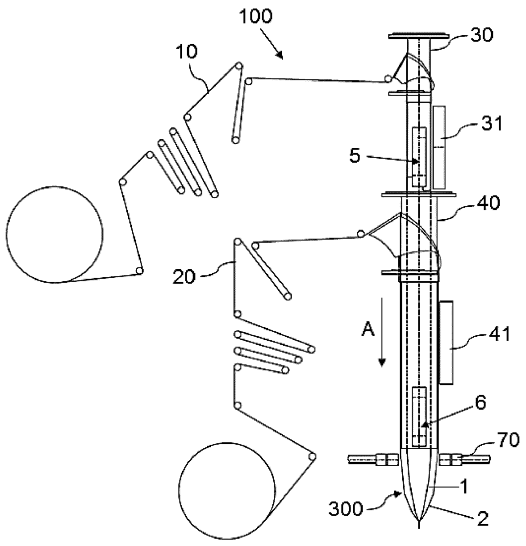

FIG. 2

EP 2 829 478 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to methods and machines for packaging products with two containers, such that there is a safety gap between both containers for damping and/or absorbing possible blows received by the product, the product thus being protected.

PRIOR ART

[0002] Packets formed by a product, a first film wrapping the product and a second film wrapping the product which is already wrapped by the first film, such as document GB526148A, for example, are known. Said document discloses a machine generating packets formed by a product (in liquid form in this case) wrapped by two films or tubes, which makes the complete packet more robust.

[0003] Machines of another type produce a packet where a product is wrapped between the first film and the second film between which there is a safety gap usually filled with gas. The safety gap filled with gas thus serves for damping and/or absorbing possible blows received by the product for the purpose of protecting the product. Document EP0190776A1 for example discloses a machine for manufacturing a packet of this type. The machine comprises an upper tube, means for arranging a film around the upper tube and generating an inner tube of film, sealing means for transversely sealing the inner tube, a lower tube receiving the inner tube of film, means for arranging a film around the lower tube and generating an outer tube of film and sealing means for transversely sealing the inner tube of film and the outer tube of film to one another. The products are wrapped inside the inner tube of film, each between two transversely sealed areas of the inner tube, and are then introduced in the outer tube of film in a row (a plurality of products in series). The two tubes of film are sealed to one another and cut at the outlet of the lower tube, the already generated packets being separated from one another.

DISCLOSURE OF THE INVENTION

[0004] The object of the invention is to provide a method and a machine for packaging products between two containers, as described below.

[0005] A first aspect of the invention relates to a method for packaging products. In the method, an inner tube of a specific diameter is generated from a first film, an outer tube with a specific diameter greater than the diameter of the inner tube is generated from a second film, and the inner tube is inserted into the outer tube.

[0006] In a first sealing operation, the two tubes are transversely attached to one another in a first sealing area of said tubes, a semi-packet which is closed at one end being obtained, the generated tubes are moved in a longitudinal forward movement direction, the inner tube being inserted into the outer tube as both tubes are moved in the forward movement direction, and at least one product is deposited in the semi-packet inside the inner tube. In a second sealing operation, the two tubes are transversely attached to one another in a second sealing area of said tubes away from the first sealing area in the forward movement direction, and a cut is made on the two tubes in the second sealing area, a packet being obtained, the second sealing operation for generating a packet and the first sealing operation for generating the next semi-packet being one and the same operation.

[0007] Therefore, packets formed by a product wrapped with two containers (the corresponding part of the two tubes) which close around the product simultaneously, between which there is a safety gap due to the difference in diameters of the outer tube with respect to the inner tube, are obtained with the method of the invention in a precise and simple manner.

[0008] If the packets are generated by previously sealing the inner tube to itself for closing a space where a product housed in said inner tube is arranged, the products which have already been closed enter the outer tube into a space demarcated by the inner tube and by way of a row of packed products. This means that when a product reaches a point where the final packet will be generated, several products have already been closed within a space demarcated by the inner tube (each forms an inner packet), so there is an error in the size or length of the inner tube which corresponds to each product. Said error can cause the product to be trapped when the outer tube is sealed by the jaws, for example, if the inner packets of the row accumulate a negative error because they are smaller than expected, or if they accumulate a positive error because said inner packets are larger than established, and the inner packet can be released from the outer tube covering it, the protective function and the aesthetics of the final packet being lost. The nature of this error lies in the fact that the film slides while moving forward, so it is difficult to predict and eliminate, such that the final packets thus made comprise more excess film because a margin must be introduced both in the inner packet and in the part of the outer tube covering it, resulting in an oversized final packet, since if the error is not absorbed, there is a risk of the product breaking or deteriorating when trying to generate the packet, such breaking or deteriorating possibly involving the need to dispose of not only that product but also the entire row of products generated up until then. The method of the invention prevents the accumulation of errors between the sizes of the inner tube with respect to the outer tube, as mentioned. This is achieved because each packet is generated without having to take into account other aspects that may have occurred previously, such as a prior sealing like the one mentioned, for example.

[0009] A second aspect of the invention relates to a machine for packaging products, comprising a first tool

for generating an inner tube of a specific diameter from a first film, a second tool for generating an outer tube with a specific diameter greater than the diameter of the inner tube from a second film, and drive means with a first actuator suitable for driving the inner tube in a longitudinal forward movement direction and with a second actuator suitable for driving the outer tube in the forward movement direction, such that the inner tube is inserted into the outer tube as the tubes move forward in the forward movement direction.

[0010] The machine further comprises a sealing and cutting station where the two tubes are transversely sealed to one another in a sealing area where the inner tube is inside the outer tube by means of jaws, a semi-packet which is closed at one end and a packet which is closed at both ends and comprising a product therein being obtained, and where a cut is made on the two tubes in the sealing area, the packet being separated from the semi-packet, and deposition means for depositing or introducing at least one product in the semi-packet, inside the inner tube.

[0011] The machine comprises only a single set of jaws. The advantages mentioned above for the first aspect of the invention (method) are achieved with the machine of the invention. Furthermore, a more cost-effective machine is obtained since only one set of jaws is used for sealing the resulting packet, for example, and it is also more compact because the fact that a second set of jaws is not required allows placing the tools used for generating the tubes closer to one another, which can be advantageous when installing the machine since it requires less space (particularly for a horizontal machine) and all the elements of the machine can be more easily manipulated (particularly for a vertical machine, where the machine acquires less height since it is more compact), and facilitates changing film reels or maintenance tasks, for example (particularly for a vertical machine as a result of the reduced height).

[0012] In view of any incident affecting the product (product being trapped, excess product in the packet, etc.), machine repair and start-up is much easier: single product wastes as mentioned above for the first aspect of the invention, the amount of film of a single packet is disposed of, and the start-up is as simple as forming the two tubes again. In the state of the art, upon previously closing the inner tube and forming the row of products, since in that area the different packets are not separated from one another (which are introduced by way of a row in the outer tube), the products which have already been wrapped by the inner tube of film and which at that time are located between the area where said sealing of the inner tube is performed and the area where the cut between wrappers are made would be disposed of together with the product in which the error has occurred, something which does not happen with the machine of the invention.

[0013] These and other advantages and features of the invention will become evident in view of the drawings and the detailed description of the invention.

DESCRIPTION OF THE DRAWINGS

[0014]

Figure 1 a is a perspective view of a packet formed by the method of the invention.

Figure 1b is a side view of the packet of Figure 1 a.

Figure 2 shows a schematic view of an embodiment of a machine for packaging products according to the invention.

DETAILED DISCLOSURE OF THE INVENTION

[0015] A first aspect of the invention relates to a method for packaging products whereby packets 200 with at least one product P therein are obtained, such as that shown by way of example in Figures 1 a and 1 b. A packet 200 is formed by a product P (in liquid or solid form) and two containers 201 and 202 attached to one another covering or wrapping the product. There is a safety gap 203 between both containers 201 and 202 for damping and/or absorbing the possible blows that the packet 200 may receive and thus prevent said blows from affecting the product P. A gas (for example, air) can be introduced in the safety gap 203, such that the safety gap 203 acts as a blow or impact absorption chamber for safeguarding the product P to a larger extent.

[0016] The method of the invention is implemented in a machine 100 adapted for packaging products P, such as that shown by way of example in Figure 2. The machine 100 shown in Figure 2 is a vertical machine, but the method could also be implemented in a horizontal machine (flow-pack machine). In the method, an inner tube 1 of a specific diameter is generated from a first film 10 and an outer tube 2 with a specific diameter greater than the diameter of the inner tube 1 is generated from a second film 20, such that the difference in diameters allows generating the safety gap 203 of the final packet 200. The inner tube 1 is formed by giving the film 10 a tube shape and longitudinally welding to one another the ends of the film 10 which have been superimposed as said film 10 acquires the tube shape. The outer tube 2 is formed in a manner similar to the inner tube 1.

[0017] In the method, the tubes 1 and 2 are made to move in a controlled manner in a longitudinal forward movement direction A as they are being generated, the inner tube 1 being inserted into the outer tube 2 as both tubes 1 and 2 move forward in the forward movement direction A.

[0018] In the method, since the inner tube 1 is inside the outer tube 2, the two tubes 1 and 2 are attached or sealed transversely to one another in a sealing area of said tubes 1 and 2 by means of jaws 70. This sealing serves to obtain a semi-packet 300 at one end and a

packet 200 at another end, as described below. When a transverse sealing operation is performed between two tubes 1 and 2 in a sealing area, a type of bag which is closed at one end (sealing area) and open at the other end (towards the area where tubes 1 and 2 are generated) is generated, as seen in Figure 2. In the method, once said sealing is performed, at least one product P is inserted or deposited in said bag and simultaneously, movement of the tubes 1 and 2 in the forward movement direction A continues to be made, the product P being moved integrally with said tubes 1 and 2. When the jaws 70 again perform another transverse sealing between the two tubes 1 and 2, since said tubes 1 and 2 have continued to move forward in the forward movement direction A, the sealing was performed in a new sealing area, the product P being arranged between both sealing areas. From the point of view of said product P, the second sealing mentioned above closes the bag (the semi-packet 300) where it has been arranged at the second end thereof, a packet 200 closed at both ends with a product P therein thus being obtained. This second sealing at the same time serves to close one end of a new bag (semi-packet 300) such as that mentioned, which will house a new product P, serving to generate a packet 200 at one end and a semi-packet 300 at another end, the semi-packet 300 being the bag open at one end which houses (or will house) a product P. The process is repeated cyclically.

[0019] A cut is also made at the same time as performing the sealing (although the cut could be made in a subsequent step), such that the packet 200 is separated from the semi-packet 300 (and from the tubes 1 and 2 that continue to be generated), and is prepared to be distributed to where it is required.

[0020] In the method, a gas can be introduced between the inner tube and the outer tube in the semi-packet 300, such that the safety gap 203 of the resulting packet 200 will be filled with gas so that said safety gap 203 acts as an absorption chamber, as mentioned above. The gas can be air or a modified atmosphere for example, which in combination with the film 10 of the inner tube 1 can improve preservation of the product P (in the case of food products).

[0021] In the method, with the product P located inside the semi-packet 300, the length of the inner tube 1 of each semi-packet 300 is further adjusted to the length of the outer tube 2, such that the inner tube 1 is longitudinally tensioned. If the inner tube 1 is not tensioned, once the packet 200 is generated the product P may rest on a base of said packet 200 (against the tubes 1 and 2 which may contact one another if the inner tube 1 has a very low tension), which would make it more vulnerable in view of possible blows or impacts of the packet 200.

[0022] The length of the inner tube 1 of a semi-packet 300 is adjusted to the length of the outer tube 2 of said semi-packet 300 without having to take into account possible prior deviations between the length or size of the inner tube 1 with respect to the outer tube 2. By adjusting the length of the inner tube 1, at least the part of the inner tube 1 belonging to the corresponding semi-packet 300 is longitudinally tensioned, and the product P arranged inside the semi-packet 300 is substantially centered therein, thus being protected to a greater extent in a simple manner. At the same time, by tensioning the inner tube 1 and centering the product P, the lowest possible amount of film 10 of the inner tube 1 is used in each packet 200, a more cost-effective packet 200 in terms of manufacturing costs being obtained by optimizing the amount of film 10 of the inner tube 1 to be used.

[0023] The tubes 1 and 2 are typically moved in the forward movement direction A simultaneously and at the same speed, subsequently causing independence between both movements to adjust the length of the inner tube 1 of a semi-packet 300 to the length of the outer tube 2, which involves a relative movement between the inner tube 1 and the outer tube 2. The inner tube 1 thus moves forward a distance equal to or less than the distance travelled by said outer tube 2 in the forward movement direction A during said adjustment, and is tensioned.

[0024] The relative movement between the two tubes 1 and 2 can be performed in different ways, such as for example by reducing the speed of movement of the inner tube 1 for a given forward movement distance of the outer tube 2, or stopping the forward movement of the inner tube 1 for a given forward movement distance of the outer tube 2, or moving back the inner tube 1 in the direction opposite the forward movement direction A once the outer tube 2 has ended its travel. The given forward movement distance of the outer tube 2 can be obtained in at least two ways:

1. The forward movement of each tube 1 and 2 between two sealing operations is measured, and if it is detected that the inner tube 1 has moved forward more than the outer tube 2, the length of the inner tube 1 is adjusted taking into account the difference between the distance travelled by the inner tube 1 and the outer tube 2. Said difference being the given forward movement distance of the outer tube 2. This applies to each semi-packet 300.

2. When the method is run for the first time, the distances travelled by both tubes 1 and 2 between two sealing operations are detected. If the inner tube 1 has moved forward more than the outer tube 2, the difference is determined, and said difference is stored as a correction factor. The correction factor (the detected difference) being the given forward movement distance of the outer tube 2. In this case it is assumed that the behavior of the tubes 1 and 2 and their forward movement will be the same at all times, so the correction factor is applied in each sealing instead of determining the difference of the distance travelled by the two tubes every time.

[0025] A second aspect of the invention relates to a machine 100 for packaging products and obtaining packets 200 such as that shown by way of example in Figure 1. The machine shown by way of example in Figure 2 refers to a vertical machine, but it is illustrated only by way of example and it could be a horizontal machine (flow-pack machine). The description describes a vertical machine 100, but what is mentioned would be similar for a horizontal machine unless otherwise indicated.

[0026] The machine 100 comprises a first tool whereby the inner tube 1 is generated and a second tool 4 whereby the outer tube 2 is generated. The first tool comprises a forming tool 30 conferring the film 10 with the corresponding tube shape to obtain the inner tube 1, and means 31 for longitudinally welding the ends of the film 10 and thus closing the inner tube 1. The forming tool 30 is a hollow tube having the diameter to be given to the inner tube 1. The second tool is similar to the first tool and comprises a forming tool 40 and means 41 for longitudinally welding the ends of the film 20 and thus closing the outer tube 2, but it is adapted so that the outer tube 2 has a diameter greater than the inner tube 1. The forming tools 30 and 40 are longitudinally distributed in the forward movement direction A, forming tool 30 corresponding to the inner tube 1 being arranged such that the inner tube 1 starts to be generated before the outer tube 2, and said outer tube 2 starts to be generated surrounding the inner tube 1.

[0027] The machine 100 comprises drive means with a first actuator 5 suitable for moving the inner tube 1 in the forward movement direction A and with a second actuator 6 suitable for moving the outer tube 2 in said forward movement direction A. The actuators 5 and 6 are conventional actuators. As it moves forward in the forward movement direction A, the inner tube 1 is inserted into the outer tube 2. The actuators 5 and 6 press on (or drive by vacuum) the corresponding tube 1 and 2 and move it, causing same to move forward in the forward movement direction A.

[0028] The machine 100 further comprises a sealing and cutting station where the two tubes 1 and 2 are transversely sealed to one another, as mentioned above in the description given for the first aspect of the invention (method). To that end, the machine 100 comprises a set of jaws 70 for performing the sealing. The machine 100 comprises a single set of jaws 70 with the associated advantages that it entails which have already been described previously.

[0029] As mentioned above when describing the first aspect of the invention, a packet 200 and a semi-packet 300 are obtained in the sealing and cutting station, in each sealing operation. Furthermore, a cut is made on the tubes 1 and 2 at the same time as performing the sealing, the packet 200 being separated from the semi-packet 300, which action is preferably performed by the same jaws 70 that are responsible for performing the sealing.

[0030] For depositing or introducing a product P in a semi-packet 300 inside the inner tube 1, the machine 100 comprises deposition means which can be, for example, a rocker arm in the case of horizontal machines. In a vertical machine 100 such as that shown in Figure 2, the product P falls by gravity through the inside of the forming tools 30 and 40.

[0031] The machine 100 can further comprise conventional injection means that are not depicted in the drawings for introducing a gas (for example, air) between the inner tube 1 and the outer tube 2 in a semi-packet 300, with a product P inside the semi-packet 300, and thus filling the safety gap 203 of the resulting packet 200 with gas so that said safety gap 203 acts as an absorption chamber, as mentioned above.

[0032] The machine 100 further comprises control means (not depicted in the drawings) which can be an automaton, a microprocessor or any other device with control capability and which communicate with the jaws 70 for controlling the operation of the jaws 70 on the tubes 1, 2. The control means furthermore communicate with the two actuators 5 and 6 for causing relative movement in the forward movement direction A of the outer tube 2 with respect to the inner tube 1 of a semi-packet 300, and thus adjusting the length of the inner tube 1 with respect to the outer tube 2, such that the inner tube 1 is longitudinally tensioned and the product P arranged inside the semi-packet 300 is substantially centered therein. Therefore, the advantages that have been described previously are obtained with the machine 100, as a result of the independence generated between the actuators 5 and 6 by the control means.

[0033] As mentioned above for the first aspect of the invention, the relative movement between the two tubes 1 and 2 can be performed in different ways, such as for example by reducing the speed of movement of the inner tube 1 for a given forward movement distance of the outer tube 2, or stopping the forward movement of the inner tube 1 for a given forward movement distance of the outer tube 2, or moving back the inner tube 1 in the direction opposite the forward movement direction A once the outer tube 2 has ended its travel. The given forward movement distance of the outer tube 2 can be obtained in two ways, the forward movement distance travelled by the tubes 1 and 2 being detected in both cases.

[0034] The distance travelled by a tube 1 or 2 can be determined by detection means (not depicted in the drawings) communicating with the control means. The detection means can be an encoder determining the actual forward movement of the corresponding film 10 or 20, a photocell detecting spots or marks in the corresponding film 10 or 20, or with other known conventional means of the state of the art.

Claims

1. Method for packaging products in which an inner tube (1) of a specific diameter is generated from a

first film (10), an outer tube (2) with a specific diameter greater than the diameter of the inner tube (1) is generated from a second film (20), and the inner tube (1) is inserted into the outer tube (2), **characterized in that** in a first sealing operation the two tubes (1, 2) are transversely attached to one another in a first sealing area of said tubes (1, 2), a semi-packet (300) which is closed at one end being obtained, the generated tubes (1, 2) are moved in a longitudinal forward movement direction (A), the inner tube (1) being inserted into the outer tube (2) as both tubes (1, 2) are moved in the forward movement direction (A), and at least one product (P) is deposited in the semi-packet (300) inside the inner tube (1), in a second sealing operation the two tubes (1, 2) are transversely attached to one another in a second sealing area of said tubes (1, 2) away from the first sealing area in the forward movement direction (A), and a cut is made on the two tubes (1, 2) in the second sealing area, a packet (200) being obtained, the second sealing operation for generating a packet (200) and the first sealing operation for generating the next semi-packet (300) being one and the same operation.

2. Method for packaging products according to claim 1, wherein the length of the inner tube (1) of each semi-packet (300) is adjusted to the length of the outer tube (2) of the corresponding semi-packet (300), such that the inner tube (1) has a length equal to or less than the outer tube (2), the tubes (1, 2) being sealed in their second area after performing said adjustment.

3. Method for packaging products according to claim 2, wherein the generated tubes (1, 2) are moved in the forward movement direction (A) simultaneously and at the same speed, subsequently causing independence between both movements to adjust the length of the inner tube (1) of a semi-packet (300) to the length of the outer tube (2) of said semi-packet (300) resulting in a relative movement between the inner tube (1) and the outer tube (2).

4. Method for packaging products according to claim 3, wherein the relative movement between the two tubes (1, 2) is performed by reducing the speed of movement of the inner tube (1) for a given forward movement distance of the outer tube (2).

5. Method for packaging products according to claim 3, wherein the relative movement between the two tubes (1, 2) is performed by stopping the inner tube (1) for a given forward movement distance of the outer tube (2).

6. Method for packaging products according to claim 3, wherein the relative movement between the two tubes (1, 2) is performed by moving back the inner tube (1) a given forward movement distance in the direction opposite the forward movement direction (A) of the outer tube (2).

7. Method for packaging products according to any of claims 4 to 6, wherein the forward movement distance travelled by the film (20) from which the outer tube (2) for each semi-packet (300) is formed and the forward movement distance travelled by the film (10) from which the inner tube (1) for each semi-packet (300) is formed are measured, the difference in the distances travelled being the given forward movement distance of the outer tube (2) in each case.

8. Method for packaging products according to any of claims 4 to 6, wherein the forward movement distance travelled by the film (20) from which the outer tube (2) for a first semi-packet (300) is formed and the forward movement distance travelled by the film (10) from which the inner tube (1) for said first semi-packet (300) is formed are measured, the difference in travelled distance between both tubes (1, 2) is determined and said distance is established as a correction factor, the correction factor being the given forward movement distance of the outer tube (2) for all the semi-packets (300).

9. Machine for packaging products, comprising a first tool for generating an inner tube (1) of a specific diameter from a first film (10), a second tool for generating an outer tube (2) with a specific diameter greater than the diameter of the inner tube (1) from a second film (20), drive means with a first actuator (5) suitable for driving the inner tube (1) in a longitudinal forward movement direction (A) and with a second actuator (6) suitable for driving the outer tube (2) in the forward movement direction (A), the inner tube (1) being inserted into the outer tube (2) as it moves forward in the forward movement direction (A), **characterized in that** it comprises a sealing and cutting station in which the two tubes (1, 2) are transversely attached to one another in a first sealing area of said tubes (1, 2) by means of jaws (70), a semi-packet (300) which is closed at one end being obtained, and after moving said tubes (1, 2) in the forward movement direction (A) and depositing at least one product (P) in the semi-packet (300), the two tubes (1, 2) are transversely attached to one another in a second sealing area of said tubes (1, 2) away from the first sealing area in the forward movement direction (A), and a cut is made on the two tubes (1, 2) in the second sealing area, a packet (200) being obtained.

10. Machine for packaging products according to claim 9, comprising control means being communicated

with the jaws (70) for controlling the operation of said jaws (70) on the tubes (1, 2), the control means being also communicated with the two actuators (5, 6) of the drive means for causing a relative movement in the forward movement direction (A) of the outer tube (2) with respect to the inner tube (1) of a semi-packet (300) and thus adjusting the length of the inner tube (1) of said semi-packet (300) to the length of the outer tube (2) of said semi-packet (300), such that the inner tube (1) has a length equal to or less than the outer tube (2) being longitudinally tensioned.

11. Machine for packaging products according to claim 10, wherein the control means cause the relative movement between the two tubes (1, 2) causing the first actuator (5) to reduce the speed of movement of the inner tube (1) for a predetermined forward movement distance of the outer tube (2).

12. Machine for packaging products according to claim 10, wherein the control means cause the relative movement between the two tubes (1, 2) causing the first actuator (5) to stop the movement of the inner tube for a predetermined forward movement distance of the outer tube (2).

13. Machine for packaging products according to claim 10, wherein the control means cause the inner tube (1) to move back a predetermined forward movement distance in the direction opposite the forward movement direction (A) of the outer tube (2).

14. Machine for packaging products according to any of claims 11 to 13, comprising detection means being communicated with the control means for determining the distance travelled by at least one film (10, 20) from which one of the tubes (1, 2) is formed.

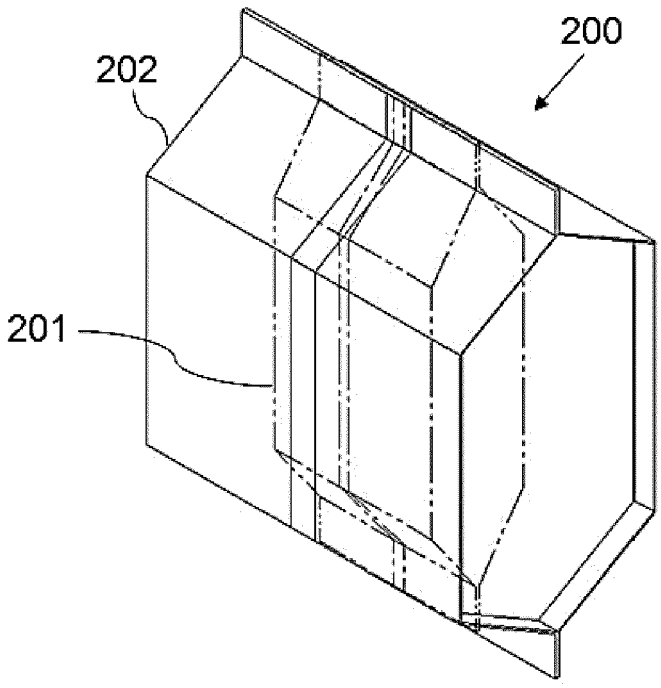

FIG. 1a

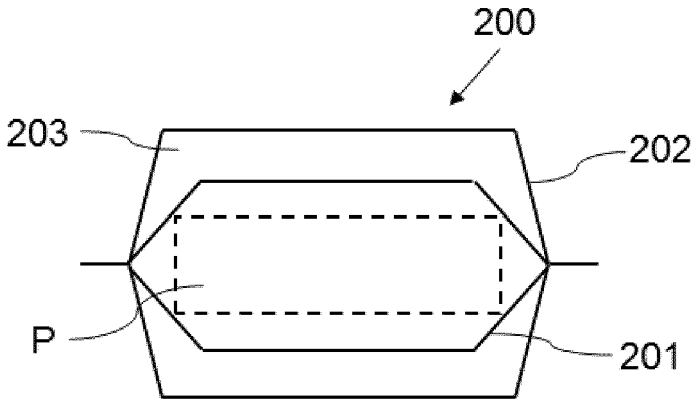

FIG. 1b

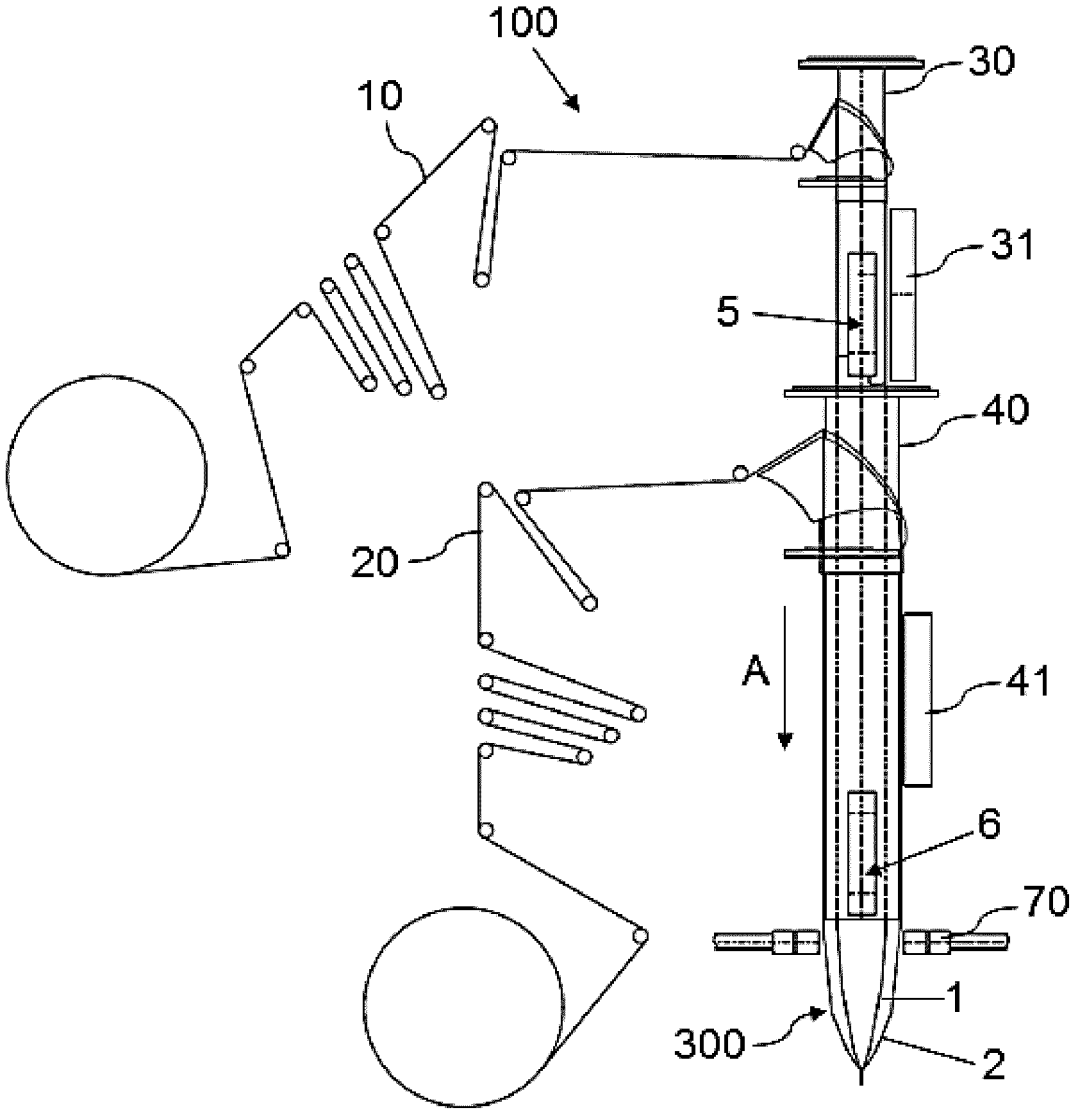

FIG. 2

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European Patent Office
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EUROPEAN SEARCH REPORT

Application Number
EP 14 38 2264

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 Y	US 3 889 446 A (SIMMONS WALTER JOHN ET AL) 17 June 1975 (1975-06-17) * column 5, line 52 - line 65; figure 1 *	1,9 2-8, 10-14	INV. B65B31/00 B65B57/00 B65B9/20
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A,D	GB 526 148 A (STOKES AND SMITH CO) 11 September 1940 (1940-09-11) * the whole document *	1-14	
A	GB 2 475 720 A (ASHWELL PACKAGING SUPPLIES LTD [GB]) 1 June 2011 (2011-06-01) * the whole document *	1-14	
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A	US 2011/297676 A1 (KORTE CHRISTIAN HEINRICH [DE]) 8 December 2011 (2011-12-08) * the whole document *	1-14	
A	EP 0 229 216 A2 (TOKYO AUTOMATIC MACH WORKS [JP]) 22 July 1987 (1987-07-22) * the whole document *	1-14	

TECHNICAL FIELDS SEARCHED (IPC)
B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	25 September 2014	Vassoille, Philippe

CATEGORY OF CITED DOCUMENTS

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