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(54) **Method for producing multiple packages, and corresponding package**

(57) A method for making a paired package (20) comprising a first flowpack wrapper (30) and a second flowpack wrapper (40). The first flowpack wrapper (30) contains a first product (P), and is formed by a first wrapping of sheet material that is closed to form a tube along a first longitudinal sealing line (162) and is provided with a first closing bellows (166) on both of its opposite ends. The second flowpack wrapper (40) contains a second product (P') and is formed by a second wrapping of sheet material that is closed to form a tube along a second longitudinal sealing line (164) and is provided with a second closing bellows (166'). The first and second wrappers are set alongside one another in a direction transverse to the aforesaid first and second longitudinal sealing lines (162, 164), and are connected to one another in a tear-separable way, at one or both of their opposite ends, in an area corresponding to the aforesaid first and second bellows (166, 166').

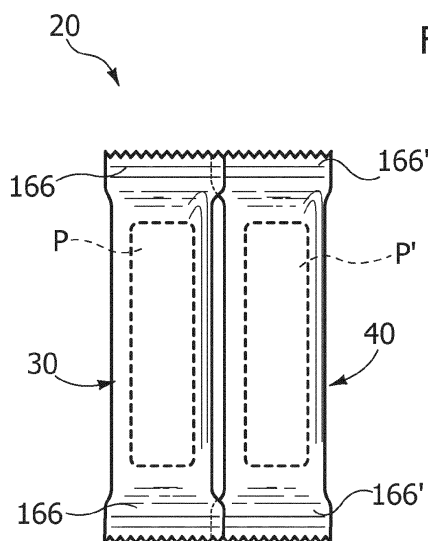


FIG. 1

Description

Field of the invention

[0001] The present description relates to packaging techniques and regards in particular techniques that enable production of multiple packages.

Description of the prior art

[0002] In the packaging sector, in particular for packaging foodstuffs, for many years now the solution known as "flowpack" (at times also referred to as "form-fill-seal" or FFS) has been widely adopted.

[0003] According to this solution, which is documented in a rather extensive literature, including patent literature, a sheet of wrapping material that is run off a reel is shaped according to a general channel-shaped conformation (usually open downwards) that enables insertion of the products in the package. The free branches of the channel-shaped conformation are then brought to couple with one another so as to provide a longitudinal sealing line ("fin"). The tubular blank thus formed, with the products located inside it, then undergoes transverse sealing and cutting, to give rise to the individual wrappers. The sealing heads cause a flattening in intermediate positions between the products, and in the flattened areas transverse sealing lines are formed in a region corresponding to which a cutting operation is performed such as to bring about separation of the individual wrappers.

[0004] In this sector, for some time there has been felt the need to make packages of this type in the form of multiple packages, for example in the form of paired packages. These multiple packages contain a number of units of product that can be consumed at different times. The user can thus, for example, separate the two wrappers and open just one of the two to consume the product or products contained therein, while the remaining products remain packaged for subsequent consumption (even at a certain distance in time) and preserve intact their characteristics precisely because they remain inside a package that is intact.

[0005] At present, this need is met primarily by resorting to packages of the type commonly referred to as "multipacks". These are packages constituted by a number of individual flowpack wrappers grouped together and packaged in a flowpack of larger dimensions.

[0006] The process of production of said multipacks then entails repeating in cascaded fashion a number of packaging processes. In addition to this, once the main flowpack has been opened, the individual flowpack wrappers that are contained inside it can get dispersed in an undesirable way.

[0007] A further drawback of the above technique is constituted by the considerable consumption of packaging material.

[0008] On the other hand, there have already been proposed in the art (see, for example, the document No. US-

B-6 789 945 and, to a certain extent, also the documents Nos. US-A-2005/0109796, US-A-2006/0151351, and US-A-5 024 536) solutions inspired by the concept of making a package comprising a number of bags set alongside one another starting from a package of larger dimensions that is then segmented with sealing lines that divide the original package into a number of compartments, each of which in turn constitutes an independent package.

[0009] Also this solution comes up, however, against various problems of implementation.

[0010] In the first place, the aforesaid sealing lines can prove anything but easy to provide when the package already contains the products inside it. In the second place, the aforesaid sealing lines can end up opposing considerable resistance in regard to any tearing stress aimed at separating the individual packages from one another according to the modalities described previously. This fact can involve, for example, the need to subject the aforesaid sealing lines to treatments of pre-incision or dinking, which are aimed at facilitating tearing for the purpose of separation of the individual packages. In the specific case, where the package divided into compartments to form individual wrappers is a flowpack, there then exists the further problem linked to the fact that in the original flowpack there may remain masses of air that might hinder subsequent squeezing of the package where the sealing lines that are to provide the aforesaid division into compartments are formed.

[0011] The present applicant has already presented, in the Italian patent application No. TO2008A000256, a method for providing multiple packages that enables prevention of the intrinsic drawbacks of the solutions according to the known art discussed above. Said method envisages, in particular, using a modified flowpack packaging plant, where the wrapping material of which the package is made is shaped so as to form at least two channel-shaped parts, connected together along a connection line that extends parallel to their direction of extension and is set between the mutually facing walls of said parts. Subsequently, respective products are inserted in said channel-shaped parts, and then the latter are first closed to form a tube via respective longitudinal sealing lines, and finally closed at the end via respective transverse sealing lines.

Object and summary of the invention

[0012] The present applicant has now devised a new method, forming the subject of the present invention, which, in addition to solving the problems of the known art to which reference has been made above, also affords various advantages over the method previously presented by the present applicant.

[0013] According to the present invention, said method presents the characteristics recalled specifically in the ensuing claims. The invention also relates to the apparatus for providing the aforesaid method and the corre-

sponding package obtained therefrom.

[0014] The claims form an integral part of the technical teaching provided herein in relation to the invention.

[0015] Various embodiments of the corresponding package give rise to a multiple package (for example a double package), where the individual wrappers are in effect structurally identical to one another and/or can be separated from one another with an action of separation that is at the same time convenient and safe, preventing any risk of undesirable accidental opening of one of the wrappers that are separated.

Brief description of the annexed drawings

[0016] The invention will now be described, purely by way of non-limiting example, with reference to the annexed drawings, wherein:

- Figure 1 illustrates an example of multiple package forming the subject of the present description;
- Figures 2 and 3 illustrate an example of wrapping material used in the method described herein for obtaining the package of Figure 1;
- Figures 4 to 6 illustrate cross-sectional views according to the planes IV-IV, V-V and VI-VI indicated in Figure 11, respectively;
- Figures 7 and 8 illustrate in greater detail respective examples of intermediate products of the method described herein;
- Figure 9 illustrates a further step of the method described herein;
- Figure 10 illustrates in greater detail the characteristics of the package that can be obtained with the method described herein; and
- Figure 11 is a schematic illustration of a plant for implementation of the method described herein.

Detailed description of examples of embodiment

[0017] Illustrated in the ensuing description are various specific details aimed at providing an in-depth understanding of the embodiments. The embodiments can be obtained without one or more of the specific details, or with other methods, components materials, etc. In other cases, known structures, materials or operations are not illustrated or described in detail so that the various aspects of the embodiments will not be obscured.

[0018] Reference to "an embodiment" or "one embodiment" in the framework of the present description is intended to indicate that a particular configuration, structure, or characteristic described in relation to the embodiment is comprised in at least one embodiment. Hence, phrases such as "in an embodiment" or "in one embodiment" that may be present in various points of the present description do not necessarily refer to the one and the same embodiment. Moreover, particular conformations, structures or characteristics can be combined in any adequate way in one or more embodiments.

[0019] The references used herein are merely provided for convenience and hence do not define the sphere of protection or the scope of the embodiments.

[0020] Figure 1 represents an example of multiple package (designated by the reference 20) that can be obtained via the method forming the subject of the present description.

[0021] The multiple package 20 comprises a first flow-pack wrapper 30, containing a first product P, formed by a first wrapping of sheet material that is closed to form a tube along a first longitudinal sealing line 162 (see Figure 11) and is provided with a first transverse sealing line (in technical jargon referred to as "closing bellows") 166 on both of its opposite ends.

[0022] The multiple package 20 further comprises a second flowpack wrapper 40 containing a second product P', formed by a second wrapping of sheet material that is closed to form a tube along a second longitudinal sealing line 164 (see Figure 11) and is provided with a second transverse sealing line (in technical jargon referred to as "closing bellows") 166' on both of its opposite ends.

[0023] The first and second wrappers are set alongside one another in a direction transverse to the aforesaid first and second sealing lines and are connected together, at one or both of their opposite ends, in an area corresponding to the aforesaid first and second transverse sealing lines (or closing bellows). As will be seen in what follows, said connection between the transverse sealing lines is of a tear-separable type. It should be noted that the sealing lines mentioned herein (longitudinal and transverse sealing lines, the latter being also referred to as "closing bellows") can be of any type suitable for the application in question. For example, said sealing lines can be obtained via heat-sealing, ultrasound sealing, or else gluing. Hereinafter, the transverse sealing lines will be called by the term "closing bellows" commonly used, without thereby wishing to refer to any of their specific embodiments.

[0024] To obtain a package of the above sort, the method described herein envisages, in general, forming a first tubular blank of the first wrapper, containing the first product, and a second tubular blank of the second wrapper, separate and distinct from the first blank and containing the second product, and setting the aforesaid first and second blanks alongside one another, and moreover making, on one or both of the opposite end portions of the aforesaid first and second blanks, a transverse sealing line that traverses both of the corresponding portions of the aforesaid first and second blanks in said condition where they are set alongside one another, and is designed to define the aforesaid first and second bellows, respectively of the aforesaid first and second wrappers, and at the same time to determine a tear-separable connection between said first and second bellows.

[0025] The aforesaid transverse sealing line (which traverses both of the corresponding portions of the aforesaid first and second blanks) constitutes a common or

shared sealing line between the two wrappers that make up the multiple package, in the sense that said line is designed to define both of the aforesaid first and second bellows (or first and second sealing lines) of said wrappers. Moreover, by the fact that it determines itself the aforesaid tear-separable connection, said line can be easily "torn" or "split" in the aforesaid first and second bellows (or first and second sealing lines) for separating the two wrappers of the multiple package.

[0026] It should be noted that, basically, said common sealing line constitutes an adhesion line; namely, where it is provided, parts of wrapping material that can be connected together are made effectively to adhere to one another (in this connection, the reader is referred to the ensuing description, where the possible modalities according to which respective parts of wrapping material can be rendered connectable to one another are explained); in the method described herein said line is such as to traverse both of the corresponding end portions of the aforesaid first and second blanks for determining the aforesaid first and second sealing lines and at the same time the aforesaid tear-separable connection between said sealing lines. As will be seen in what follows, preferably said line extends continuously, traversing completely the corresponding ends of the aforesaid first and second blanks.

[0027] In various embodiments, as in the one illustrated, in said method setting said first and second blanks alongside one another comprises setting said first and second blanks at a distance apart from one another such that in creating the aforesaid sealing or adhesion line an overlapping of said corresponding portions of said first and second blanks is brought about, so that said sealing or adhesion line determines a tear-separable connection between overlapping parts of said corresponding portions. In various embodiments, the parts of said corresponding portions - of said first and second blanks - that are to overlap are at least partially connectable to one another.

[0028] Figures 2 and 3 illustrate an example of sheet wrapping material 10 starting from which, via said method, the multiple package illustrated in Figure 1 can be obtained. With reference to said figures, in the wrapping material 10 the two opposite surfaces 10a and 10b have at least on part of their extension characteristics of sealability that differ from one another. For example (the persons skilled in the sector will on the other hand appreciate immediately that the same basic concepts illustrated on the basis of this example can be implemented by resorting to a wide range of equivalent solutions), the sheet 10 can be constituted by a sheet of aluminium (or of plastic material, such as polypropylene) "coupled", i.e., coated on the surface 10a, with a heat-sealable (or ultrasound sealable) plastic material, such as polyethylene. On the surface 10b, the aluminium (or plastic) material is not instead coated other than in areas 10c (which may mate with homologous areas 10c' situated in a position specularly symmetrical to the areas 10c with respect to the

folding direction, as will be described more fully in what follows), where a heat-sealable (or ultrasound sealable) plastic material, such as polyethylene, is applied.

[0029] In the preferred example illustrated in Figures 2 and 3, the surface 10b has both of the areas 10c and 10c'. As may be noted from Figure 2, the areas 10c and 10c' are located along one and the same ideal line that is substantially orthogonal to the direction of longitudinal development of the wrapping sheet 10 (which is indicated by the arrow A in Figure 2 and corresponds also to the direction of advance of the sheet 10 itself in the method described in what follows). In any case, the general principle whereby the areas 10c (and the areas 10c', if present) are defined and arranged will become evident in the sequel in the course of the description regarding the step of the method in which said areas perform their function. It is in any case immediately evident for the person skilled in the sector of flowpack methods that the areas 10c and 10c' illustrated in Figure 2 are, on one, front (with respect to the direction of A), half thereof (defined by an ideal cutting line orthogonal to the direction A), designed for the production of a first multiple package and, on the other, rear, half, for the production of a second multiple package (subsequent to the first package with respect to the direction of advance A).

[0030] Once again it is recalled that the example made previously with reference to specific materials expresses a principle that can be implemented by resorting to different materials and/or in a different way. Just to provide an example, it may be considered that the sheet 10 is constituted by non-heat-sealable plastic material that on the surface 10a is treated with a heat-sealing lacquer or else laminated with a sealing layer, whereas instead on the surface 10b, only in the areas 10c (and, if present, the areas 10c') it is rendered heat-sealable by application of heat-sealing lacquer.

[0031] Basically, whatever the solution adopted in terms of choice of the materials and/or of connection technique adopted (heat-sealing, ultrasound sealing, gluing, etc.), whereas the surface 10a can be connected to a homologous surface, the surface 10b resists the action of connection with a homologous surface, except in the areas 10c (and the areas 10c', if present).

[0032] In various embodiments, as in the one illustrated in the figures, the method forming the subject of the present description can envisage the steps of:

- providing a sheet of wrapping material;
- shaping, on the aforesaid first and second products, said wrapping material to form at least two channel-shaped parts alongside one another, which have a U-shaped region and two side branches extending from the respective U-shaped region towards respective distal flaps, and which contain respectively the aforesaid first and second products;
- cutting the sheet material in an intermediate position between the channel-shaped parts themselves, so that said channel-shaped parts set alongside one

another form distinct parts;

- closing said channel-shaped parts at the aforesaid respective distal flaps to form a tube; and
- connecting together the respective distal flaps to form said first and second longitudinal sealing lines.

[0033] In various embodiments, as in the one illustrated, in said method the step of forming the aforesaid channel-shaped parts comprises the operation of pulling by the side flaps the sheet of wrapping material against the aforesaid first and second products and at the same time forming a depression in a central portion of the wrapping sheet, set between said first and second products, so as to cause raising on the sheet of wrapping material of said channel-shaped parts formed alongside one another.

[0034] The method described above can in general be implemented with an apparatus comprising:

- a line for feeding a sheet of wrapping material;
- a line for conveying the aforesaid first and second products;
- means for forming, starting from the aforesaid sheet of wrapping material, a first tubular blank of the aforesaid first wrapper, containing the aforesaid first product, and a second tubular blank of the aforesaid second wrapper, separate and distinct from the first blank and containing the aforesaid second product, and setting the first and second blanks alongside one another;
- means for providing, on one or both of the opposite end portions of the aforesaid first and second blanks, a transverse sealing line that traverses both of the corresponding end portions of the aforesaid first and second blanks in the aforesaid position where they are set alongside one another, and is designed to define a first bellows and a second bellows, respectively, of the aforesaid first and second wrappers, and to determine at the same time a tear-separable connection between the aforesaid first and second bellows.

[0035] Figures 4 to 11 illustrate a preferred embodiment of such an apparatus.

[0036] With reference to Figure 11, said apparatus comprises a line for feeding a wrapping material, for example made of the material illustrated in Figures 2 and 3 discussed above. Said material can be in the form of a web that is run off a reel B set in a raised position with respect to the rest of said feed line.

[0037] Said apparatus further comprises a line for conveying the products to be packaged, comprising in the specific case two conveyor belts T, T' (or else one conveyor belt divided into two product conveying paths) that run parallel to one another in the direction of advance A. As will be seen hereinafter, said direction A corresponds to the direction of advance both of the sheet of wrapping material 10 and of the products P and P'. Said conveyor belts are controlled in a co-ordinated way for conveying

the products P, P' in a condition where they are set alongside one another.

[0038] The apparatus further comprises a shaping station 120 that is traversed by the aforesaid conveying and feed lines. In particular, the line for feeding the wrapping sheet enters the shaping station with a descending branch of the wrapping sheet, which in said station is then brought back substantially parallel to the direction A referred to above. It should be noted that the inclination of the aforesaid branch, with respect to the line for conveying the products, facilitates intervention of the means - which will be described in what follows - of said station that have the function of pulling said sheet of wrapping material against said products.

[0039] In general, said station comprises first means designed to pull by the side flaps the aforesaid sheet of wrapping material against the products P, P' on the conveyor belts, and second means designed to make a depression in a central portion of the wrapping material set between the two rows of products.

[0040] The aforesaid first and second means are co-ordinated in such a way as to cause raising on the wrapping material of the two channel-shaped parts formed alongside one another mentioned previously. In the specific case, said shaping station comprises two side laminas 90 and one central lamina 92 that extend, starting from one and the same position, parallel to and set alongside one another in the direction A, in an area corresponding to the two conveyor belts T and T'. The central lamina 92 extends slightly further forward than said conveyor belts and, immediately downstream of said lamina, said shaping station envisages two or more pairs of opposed rollers 102, which, with the aid of the two side laminas 90, have the function of pulling by the side flaps the wrapping material against the products P and P'. The action of the rollers 102 will be described in the detail in what follows; in any case, it should here be pointed out that the function referred to above - of pulling the wrapping material by the flaps - is in itself carried out just by the rollers 102, whilst the side laminas 90 act simply as guide for said flaps.

[0041] The central lamina 92 has, instead, the function of forming a depression in the central portion of the wrapping sheet that is set between the two rows of products.

[0042] As may be seen in Figure 11, the side laminas 90 and the central lamina 92 each have, in an area corresponding to their end facing in the direction opposite to the flow of the products and of the wrapping material, an inclined edge designed to constitute a guide for the branch of the wrapping material entering the shaping station 120. Said laminas have, moreover, at said ends, respective wheels 94 designed to favour sliding of the wrapping material and prevent a sticking of said laminas in said material, which could cause tearing of the material itself.

[0043] As may be seen in the figure, the co-ordinated action between the means referred to above has the function of shaping the wrapping sheet according to a form

having the aforesaid channel-shaped parts set alongside one another, with the products P and P', respectively, inside them.

[0044] In particular, with reference to Figure 4:

- each of the two channel-shaped parts set alongside one another has a U-shaped region and two side branches (which are symmetrical or, as in the example illustrated herein, asymmetrical, for reasons that will emerge more clearly in what follows) extending from the U-shaped region;
- the two channel-shaped parts set alongside one another have two inner side branches that are connected together in an area corresponding to their distal flaps, designated by the reference number 14a.

[0045] Once again with reference to Figure 11, the central lamina has, in a position downstream of the two side laminas, and in a region once again corresponding to the two conveyor belts, a blade 96 designed to separate the distal flaps 14a, in such a way that said channel-shaped parts are separate and distinct from one another.

[0046] As may be seen in Figures 5 and 11, once the sheet material 10 exceeds the two conveyor belts T and T', the two channel-shaped parts close to form a tube, each around the respective row of products, as a result of the action of the two opposed rollers 102 (which, as will be seen in greater detail in what follows, press all four distal flaps of said channel-shaped parts against one another). In this way, as soon as the products leave the conveyor belts, they are immediately taken up by the tube-like portion that in the mean time has formed around them (see Figure 5).

[0047] As represented schematically in Figures 4, 5 and 6, in said tube-like configuration of the wrapping material the free flaps of the two channel-shaped parts (designated by 14a, in the case of the free flaps of the two inner branches, which are shorter and set up against one another, and by 14b, in the case of the free flaps of the two outer branches, which are longer and opposite to one another) are set up against each other so as to form a layered structure designated as a whole by 16.

[0048] From Figure 4 it may be understood that, in the example of embodiment illustrated, the outer flaps 14b are longer than the inner flaps 14a by a length approximately equal to the width of the products P. In this way, when the various flaps are gathered to form the structure 16, located in position substantially half-way between the products P, the greater length of the outer flaps 14b causes the end margins of all the flaps gathered in the structure 16 to be set practically alongside one another, without any of them projecting from the structure 16.

[0049] As may be seen in Figure 6, the structure 16 (comprising four layers, i.e., - in order - the outer flap 14b and the inner flap 14a of one of the channel-shaped parts, and then the inner flap 14a and the outer flap 14b of the other channel-shaped part) is then made to advance through the opposed rollers 102. In said embodiment,

the opposed rollers 102 also constitute a longitudinal-sealing assembly that is to form, in the way described in what follows, the so-called longitudinal fin of a flowpack wrapper. It is, however, clear that, according to alternative embodiments of the apparatus, there may be envisaged a longitudinal-sealing assembly distinct from the rollers 102, and set downstream thereof.

[0050] Whereas in the conventional operation of flow-pack packaging machines the longitudinal fin is formed as a result of juxtaposition and sealing of two flaps of sheet material fed through one said longitudinal-sealing assembly, in the example illustrated herein the flaps of sheet material that are set on top of one another in layers and passed through the sealing assembly 102 are four in number.

[0051] The effect of the sealing action obtained by the sealing assembly 102 is, however, conditioned by the characteristics of sealability/connectability of the sheet 10 illustrated at the start.

[0052] In the specific case, the four flaps 14a, 14b that advance within the sealing device 102 have in sequence the following alternation of characteristics of sealability (which can be ideally viewed proceeding from left to right and with reference to the point of observation of Figure 5):

- a first flap 14b with an outer surface (i.e., external with respect to the layered structure 16) corresponding to the surface 10b of the sheet 10 and hence not sealable and an inner surface corresponding to the surface 10a of the sheet 10 and hence sealable;
- a second flap 14a, the surface of which facing the first flap 14b seen previously corresponds to the surface 10a of the sheet 10 and is hence sealable, whilst the opposite surface corresponds to the surface 10b of the sheet 10 and is not sealable;
- a third flap 14a, with an outer surface facing the second flap seen previously corresponding to the surface 10b of the sheet 10 and hence not sealable, and with an inner surface corresponding to the surface 10a of the sheet 10 and hence sealable; and finally
- a fourth flap 14b, with an inner surface (i.e., internal with respect to the layered structure 16) facing the third flap seen previously and corresponding to the surface 10a of the sheet 10 and hence sealable, and an opposite surface (external with respect to the layered structure 16) that corresponds to the surface 10b of the sheet 10 and hence not sealable.

[0053] The net action of the sealing tool 102 will be hence that of connecting together, with formation of sealing lines, the flaps the opposite surfaces of which are sealable.

[0054] In other words, with reference to the alternation of sealable and non-sealable surfaces referred to above, the net action of the sealing tool 102 is to produce sealing of:

- the first flap 14b with the second flap 14a, with formation of a first longitudinal fin 162, which closes in a tube the first of the channel-shaped parts of the blank of wrapping material in Figure 4; and
- the third flap 14a with the fourth flap 14b, with formation of a second longitudinal fin 164, which closes in a tube the second of the channel-shaped parts of the blank of wrapping material in Figure 4.

[0055] The tool 102 does not instead bring about sealing of the second flap with the third flap (i.e., of the two inner flaps 14b) since these flaps expose to one another surfaces that cannot be sealed to one another.

[0056] The two fins 162 and 164 formed by the sealing device 102 are thus independent of one another and can be separated away from one another, as is clearly illustrated in Figure 9, for example via a so-called "plowshare" (not illustrated in the figures).

[0057] Figure 7 is a schematic illustration of the mutual configuration of the wrapping material and of the products that are obtained with the apparatus of Figure 11, in the area set between the rollers 102 and the transverse cutting and sealing station 122 (which will be described more fully hereinafter). As may be seen in said figure, said configuration presents two distinct tubular blanks 30', 40' - closed in a tube-like form along respective longitudinal sealing lines and each containing a respective product - that occupy positions set alongside one another in a direction transverse to their respective longitudinal sealing lines. In Figure 7 the two tubular blanks are represented as being at a given distance from one another. To bring the blanks into said mutual arrangement, there may, for example, be envisaged, downstream of the rollers 102, a spacer element designed to move the blanks up away from one another to the aforesaid distance. However, once again as will be discussed in what follows, said distance may also be zero and the two blanks hence remain substantially in contact with one another.

[0058] As may be seen in Figure 7, in the aforesaid mutual configuration, one of the two blanks is provided with a connection area 10c, on each of its opposite ends, in a position laterally shifted so as to give out onto a respective corresponding end of the other blank. If, as illustrated in said figure, also the areas 10c' are present, they are located on the other blank, in positions specularly symmetrical to the areas 10c - with respect to an ideal plane parallel to the axial direction of the two tubular blanks and set between these - and facing these.

[0059] As schematically illustrated in Figures 8, 9, and 11, the two tubular blanks thus formed are then made to advance towards the transverse-sealing station 122, comprising jaw units 112 (with reciprocating or rotary motion) designed to form on each tubular blank the end closing bellows of the package.

[0060] Provided in said jaw units is a transverse sealing line 200 that traverses both of the corresponding end portions of the tubular blanks and superposes the areas 10c on the areas 10c', if present, or else on corresponding

portions of the blank opposite to the one in which said areas 10c are provided. Said sealing line is consequently designed to create the respective closing bellows 166, 166' of said blanks and at the same time a tear-separable connection between said bellows. Hereinafter the mechanism with which said connection is provided is explained in detail.

[0061] When the two jaws squeeze the end portions of said blanks to form the respective closing bellows, the latter flatten out and expand laterally until they overlap one another in an area corresponding to their respective mutually facing parts, on which, as has been said previously, the areas 10c and, if present, the areas 10c', are located. Said areas 10c are consequently in contact either with the corresponding areas 10c' of the opposite blank, or else with corresponding portions of the latter, and the action of the two jaws determines sealing and connection between said parts in contact.

[0062] At the same time, in a way in itself known, said jaws create the respective end bellows 166, 166' of the two blanks, which, from what has been described above, will be connected to one another in the areas 10c (and 10c', if present).

[0063] According to altogether known criteria, such as to not to require any detailed description herein, in said specific example the jaw units of the station 122 are moreover designed to separate the pairs of flowpack wrappers - which they themselves have just completed - from the rest of the wrapping material. Alternatively, there may instead be envisaged a station 112 designed for providing the transverse sealing line 200, and, in addition, a station downstream of the station 122, where segmentation (or cutting) is performed of the chain of multiple packages, which, in this case, are supplied at output from the station 122.

[0064] It should once again be noted that the mechanism of sealability/non-sealability described previously can be achieved with the choice of constituent materials and/or of a structure in the sheet material 10 different from the one described previously, albeit maintaining the general concept of providing in the packet the elements that advance through the sealing assembly 102 (whatever the principles that regulate operation of said assembly may be) a sequence of flaps of sheet material sealable in pairs to form the fins 162 and 164, which, however, remain independent, i.e., not sealed to one another.

[0065] Persons skilled in the sector will appreciate on the other hand that the mechanism of sealability/non-sealability described previously is suited to being implemented also with application of adhesives, hence, for example, with the use of a sheet material 10 the opposite surfaces 10a and 10b of which are both in themselves non-sealable, but are rendered sealable if need be (areas 10c, 10c', flaps 14a, 14b) with local application of adhesive, for example via purposely provided dispensing nozzles.

[0066] Persons skilled in the sector will moreover appreciate that the sealability between two opposite sur-

faces does not require in an absolute way that the two surfaces be identical to one another. This happens in the case of the example illustrated herein, where it has been at least implicitly assumed that the surface 10a of the sheet 10 will have uniform surface characteristics throughout its development, so that the mutually facing surfaces of the flaps 14a, 14b sealed to one another in pairs to form the fins 162 and 164, are the same as one another and - for example - both coated with a heat-sealable material. The sealability between two surfaces can in fact derive, for example, from the presence of a heat-sealable material or from application of an adhesive material also on just one of the two surfaces in question. This applies of course also in relation to the connection areas 10c and 10c': in this regard it has in fact been pointed out a number of times that the presence of the areas 10c' is altogether optional.

[0067] The final package thus obtained, designated as a whole by the reference 20 in Figure 1, is constituted by two flowpack wrappers set alongside one another in a direction transverse to the longitudinal sealing lines of the two wrappers, and connected together at the respective end bellows. The characteristics of resistance of the connection made between the bellows (connection that is designed to be tear-separable when the consumer wishes to separate the two parts of the package) can be determined exactly and precisely (for example, during production of the sheet material 10, i.e., during creation of the areas 10c - and of the homologous areas 10c', if present), preventing said connection, on the one hand, from being too weak, with the risk of an undesirable separation of the wrappers and, on the other hand, from offering an excessively high resistance to tear, exposing the consumer to the risk of tearing in an undesirable way one of the wrappers that are for the moment not to be opened.

[0068] It is in any case to be noted that the connection between the two packages at their bellows enables concentration, on these, of the stresses that are generated when the user separates said wrappers, and hence prevents, during their separation, any risk of tearing of said wrappers, since said bellows are formed by as many as two layers sealed to one another (along the transverse sealing line 200) and are consequently extremely strong. In addition, since to divide said wrappers it is necessary to intervene only at their ends, the products contained therein are not subjected to any stress, and there is consequently no risk of them getting broken as a result of the forces exerted to separate the two wrappers.

[0069] The operations described above with reference to the annexed figures constitute a preferred example of embodiment of the method described herein. In particular, the steps illustrated in Figure 11 and in Figures 4 to 6 represent the preferred modalities to obtain the specific configuration illustrated in Figure 7, i.e. - with reference to the main characteristics of said configuration - to obtain two distinct tubular blanks, which are closed in tubular form along respective longitudinal sealing lines and each

contain a respective product, and that are set alongside one another in a direction transverse to the aforesaid longitudinal sealing lines.

[0070] It should, however, be noted that said configuration can be obtained also according to other modalities. For example, the two or even more tubular blanks can be formed separately according to the conventional modalities of a normal flowpack packaging line, and, then be arranged alongside one another in the configuration described above, in order to be able then to form on their corresponding end portions the aforesaid transverse sealing line, designed to determine the respective closing bellows of said blanks and at the same time a tear-separable connection between said bellows. For this purpose, said blanks set alongside one another must be either set in contact with one another, or else their mutual distance, if not zero, must be in any case such that, as described previously, when their end portions are squeezed to form the respective closing bellows, these flatten out and expand laterally until they overlap the corresponding portions of the blank or blanks set alongside, and enable in this way, for what has been described previously, a mutual connection between the overlapping parts. As on the other hand has already been mentioned previously, said parts for connection of the end portions may be connectable to one another either as already the sheet material that is run off the reel is sealable in said parts, for example, because in the production of the reel these have been coated with heat-sealing lacquer, or because in the process of production of the multiple package they have been rendered connectable and/or sealable via application of adhesive and/or heat-sealing material.

[0071] It should, however, be pointed out that an albeit minimal distance between the two tubular blanks 30' and 40', in their mutual configuration where they are set alongside one another, enables a connection to be obtained between the bellows that is more precise and free from residual stresses - which are, instead, generated when the two flowpack wrappers are in contact and press against one another - and to obtain, in general, a global appearance of the package that is more pleasant.

[0072] It will moreover be appreciated that the operation of segmentation must not necessarily be provided in a position corresponding to each of the transverse sealing lines 200. The solution described herein is suited, in fact, very conveniently to providing multiple packages comprising a number of blocks of, for example, two individual wrappers, coupled in pairs (bi-pack) in a position where they are set alongside one another and connected together in a tear-separable way at the end bellows, where the various blocks are arranged in a positions set head-on with respect to one another and are connected at the end bellows defined by one and the same transverse line 200 (which, when it is not cut completely, can undergo "pre-incision" or "dinking" so that it can be torn in a precise way in order to separate the individual packages without tearing the tubular wrapper thereof in which

the product is wrapped).

[0073] The solution described herein enables a bi-pack package (or in general a multiple package) to be produced that is altogether compact, in the sense that the individual flowpack wrappers paired with one another assume the conformation of a package resembling the one that would be obtained by inserting the wrappers in question in a multipack package of an adherent type.

[0074] The solution described herein can be implemented with appropriate modifications to flowpack machines commonly available in packaging plants.

[0075] Of course, without prejudice to the principle of the invention, the details of construction of the embodiments may vary, even significantly, with respect to what is described herein purely by way of non-limiting example, without thereby departing from the scope of the invention as defined in the ensuing claims. This applies in particular, but without any limitation, to:

- the possibility of applying the mechanism described to the production of multiple packages comprising three or more individual wrappers (and not two, as in the example illustrated herein); and
- the possibility of envisaging the differentiated characteristics of connectability/non-connectability described previously, only on the parts of the wrapping sheet where said characteristics are effectively involved (for example, envisaging the presence of sealable/non-sealable material or the application of adhesive/antiadhesive material only on the flaps 14a and 14b).

Claims

1. A method for making a multiple package (20) comprising a first flowpack wrapper (30) and a second flowpack wrapper (40), wherein said first flowpack wrapper (30) contains a first product (P), and is formed by a first wrapping of sheet material that is closed to form a tube along a first longitudinal sealing line (162) and is provided with a first transverse sealing line (166) on both of its opposite ends, wherein said second flowpack wrapper (40) contains a second product (P'), and is formed by a second wrapping of sheet material that is closed to form a tube along a second longitudinal sealing line (164) and is provided with a second transverse sealing line (166') on both of its opposite ends, said method being **characterized in that** it envisages forming a first tubular blank (30') of said first wrapper, containing said first product (P), and a second tubular blank (40') of said second wrapper, separate and distinct from said first blank and containing said second product (P'), and setting said first and second blanks alongside one another, and **in that** it envisages making, on one or both of the opposite

end portions of said first and second blanks, a common transverse sealing line (200), which traverses both of the corresponding end portions of said first and second blanks in said position where the blanks are set alongside one another and is designed to define said first and second transverse sealing lines (166, 166'), respectively of said first and second wrappers, and to determine at the same time a tear-separable connection between said first and second transverse sealing lines.

2. The method according to Claim 1, wherein setting said first and second blanks (30', 40') alongside one another comprises setting said first and second blanks (30', 40') at a distance apart from one another such that said common sealing line (200) overlaps said end portions of said first and second blanks determining said connection between said first and second transverse sealing lines.
3. The method according to Claim 1 or Claim 2, wherein forming said first and second blanks envisages respectively:
 - forming a first wrapping designed to receive said first product and closing said wrapping along said first longitudinal sealing line (162) to form a tube; and
 - forming a second wrapping designed to receive said second product and closing said wrapping along said second longitudinal sealing line (164) to form a tube.
4. The method according to any one of the preceding claims, wherein the formation of said first and second blanks comprises the operations of:
 - providing a wrapping sheet (10);
 - providing said first and second products (P, P');
 - shaping, on said first and second products, said wrapping sheet (10) to form at least two channel-shaped parts alongside one another, which have a U-shaped region and two side branches extending from the respective U-shaped region towards respective distal flaps (14a, 14b), and that contain, respectively, said first and second products;
 - cutting said sheet (10) in an intermediate position (14) between the channel-shaped parts themselves so that said channel-shaped parts set alongside one another form distinct parts;
 - closing said channel-shaped parts along said respective distal flaps (14a, 14b) to form a tube; and
 - connecting together the respective distal flaps (14a, 14b) to form said first and second longitudinal sealing lines (162, 164).

5. The method according to Claim 4, wherein forming said at least two channel-shaped parts comprises the operation of pulling by its side flaps said wrapping sheet against said first and second products and at the same time forming a depression in a central portion of the wrapping sheet set between said first and second products so as to cause, on said wrapping sheet, raising of said channel-shaped parts set alongside one another.

6. The method according to any one of Claims 3 to 5, comprising the operation of separating from one another said first and second longitudinal sealing lines (162, 164).

7. The method according to any one of Claims 4 to 5, wherein said operation of closing said channel-shaped parts set alongside one another to form a tube comprises the steps of:

- setting on top of one another in a layered structure (16) the distal flaps (14a, 14b) of said channel-shaped parts formed alongside one another, wherein each of the distal flaps (14a, 14b) in said layered structure (16) can be connected to an adjacent distal flap (14a, 14b) belonging to the same channel-shaped part;

- passing said layered structure (16) through a connection assembly (102) to connect to one another the adjacent distal flaps (14a, 14b) belonging to one and the same channel-shaped part to form said first and second longitudinal sealing lines (162, 164).

8. A multiple package comprising:

- a first flowpack wrapper (30) containing a first product (P) and formed by a first wrapping of sheet material that is closed to form a tube along a first longitudinal sealing line (162) and is provided with a first transverse sealing line (166) on both of its opposite ends;

- a second flowpack wrapper containing a second product (P') and formed by a second wrapping of sheet material that is closed to form a tube along a second longitudinal sealing line (164) and is provided with a second transverse sealing line (166') on both of its opposite ends; said first and second wrappers being set alongside one another in a direction transverse to said first and second longitudinal sealing lines (162, 164),

said package being **characterized in that** said first and second wrappers are connected to one another in a tear-separable way, at one or both of their opposite ends, along said first and second transverse sealing lines (166, 166').

9. The package according to Claim 8, wherein said first and second wrappers are connected to one another only in an area corresponding to said first and second transverse sealing lines (166, 166').

10. The package according to Claim 8 or Claim 9, comprising a common transverse sealing line (200) that traverses both of the corresponding end portions of said first and second wrappers in said position where they are set alongside one another, and is designed to define said first and second transverse sealing lines (166, 166'), respectively of said first and second wrappers, and to determine at the same time the connection between said first and second transverse sealing lines.

11. An apparatus for implementing a method according to any one of Claims 1 to 7, **characterized in that** it comprises:

- a line for feeding a wrapping sheet (10);

- a line for conveying said first and second products (P, P');

- means (90, 92, 102) for forming, starting from said wrapping sheet, a first tubular blank (30') of said first wrapper, containing said first product (P), and a second tubular blank (40') of said second wrapper, separate and distinct from said first blank and containing said second product (P'), and for setting said first and second blanks alongside one another;

- means (112) for providing, on one or both of the opposite end portions of said first and second blanks, a common transverse sealing line (200) that traverses both of the corresponding end portions of said first and second blanks in said position where they are set alongside one another, and is designed to define a first transverse sealing line (166) and a second transverse sealing line (166'), respectively, of said first and second wrappers, and to determine at the same time a tear-separable connection between said first and second transverse sealing lines.

12. The apparatus according to Claim 11, wherein said means for forming said first and second blanks comprise a shaping station (120), traversed by said feed line, and comprising first means (102; 90, 102) designed to pull by its side flaps said wrapping sheet against said first and second products on said conveying line, and second means (92) for forming a depression in a central portion of the wrapping sheet between said first and second products, said first and second means being co-ordinated in such a way as to bring about raising on said sheet of wrapping paper channel-shaped parts set alongside one another, each having a U-shaped region and two side branches that extend from the U-shaped region

towards respective distal flaps (14a, 14b).

13. The apparatus according to Claim 12, wherein said first means (102) are moreover designed to close in a tube-like form along said distal flaps (14a, 14b) said channel-shaped parts, inside which are said first and second products (P, P'). 5
14. The apparatus according to any one of Claims 11 to 13, wherein said feed line is designed to set said first and second blanks (30', 40') at a distance apart from one another such that said common transverse sealing line (200) overlaps said end portions of said first and second blanks, determining said connection between said first and second transverse sealing lines. 10 15

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FIG. 1

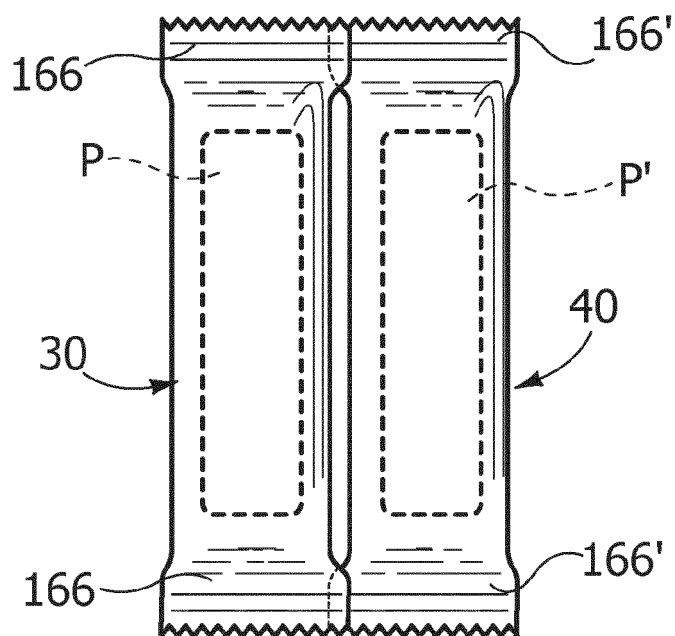


FIG. 2

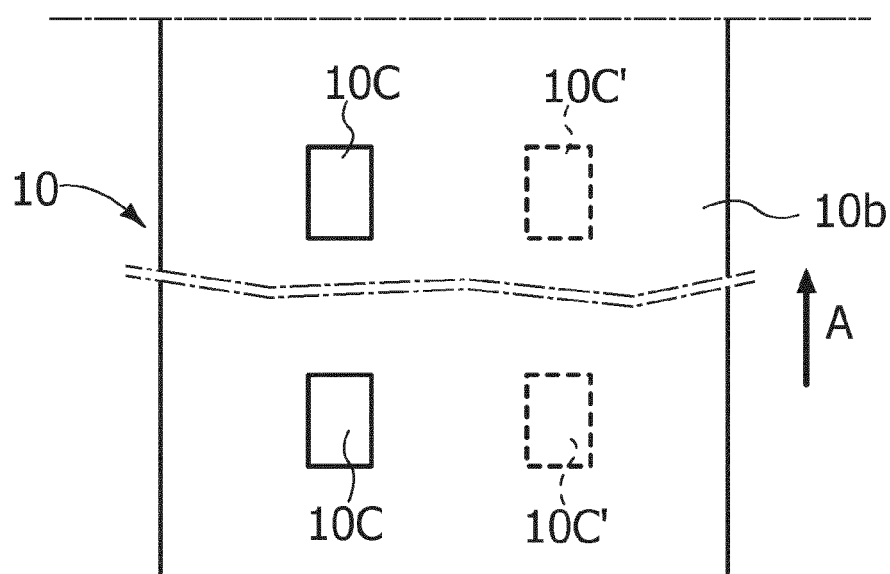


FIG. 3

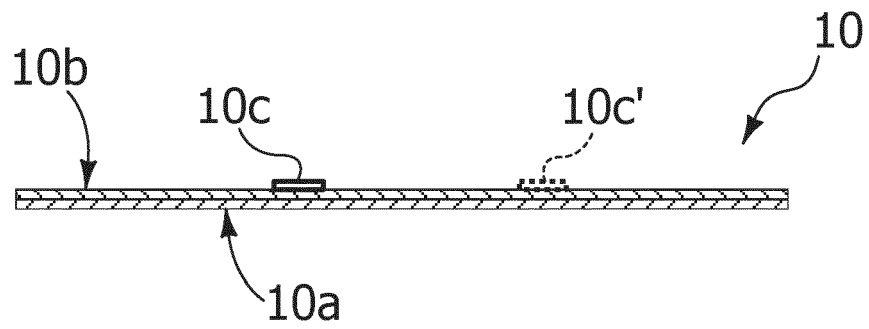


FIG. 4

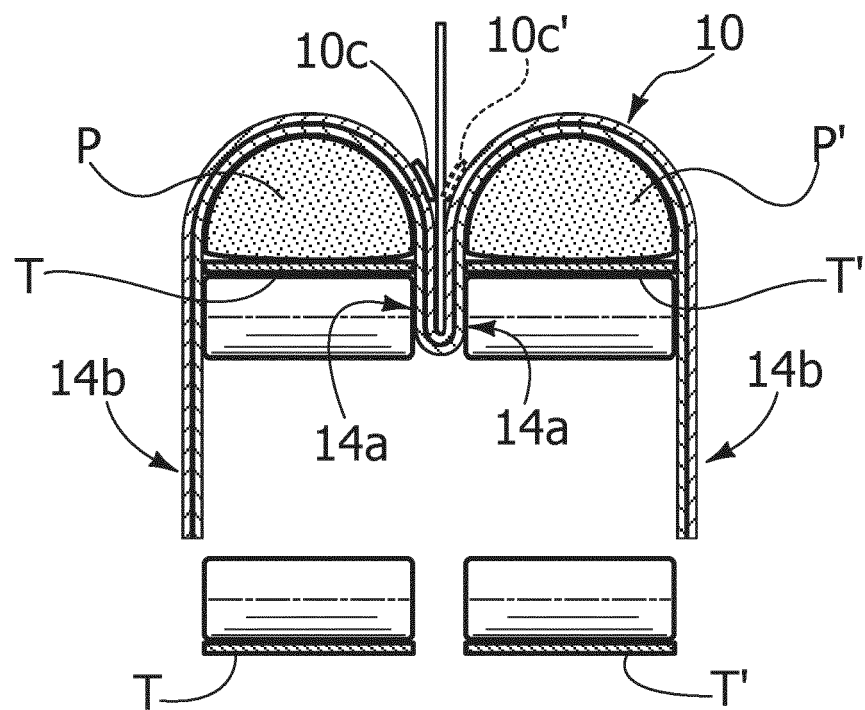


FIG. 5

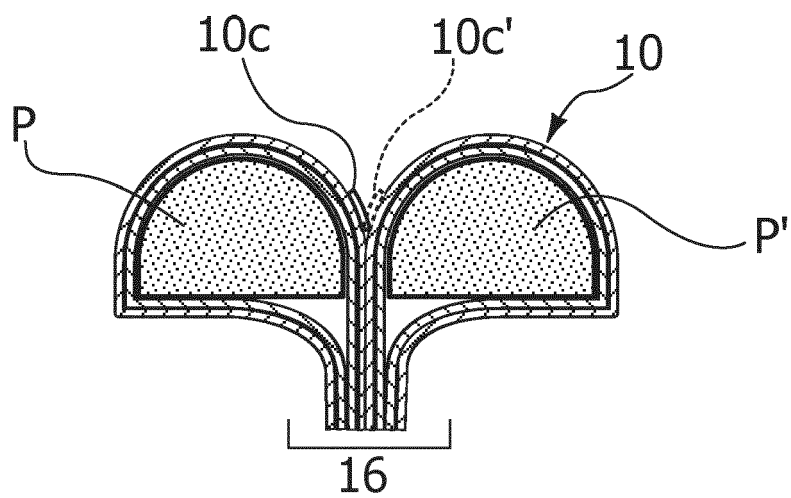


FIG. 6

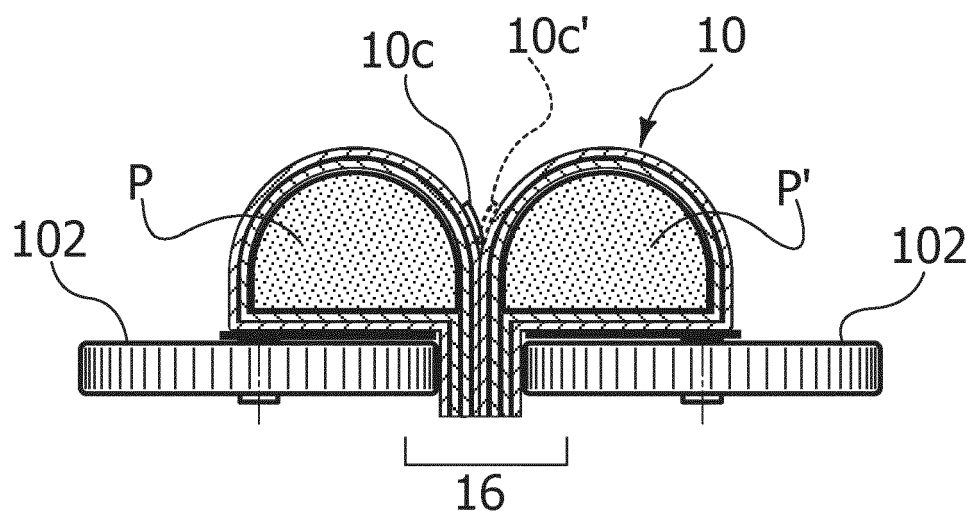


FIG. 7

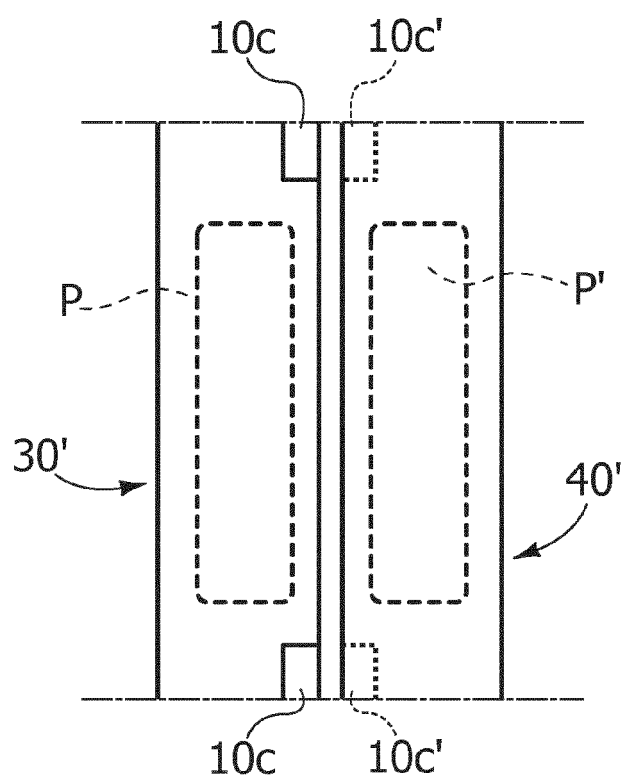


FIG. 8

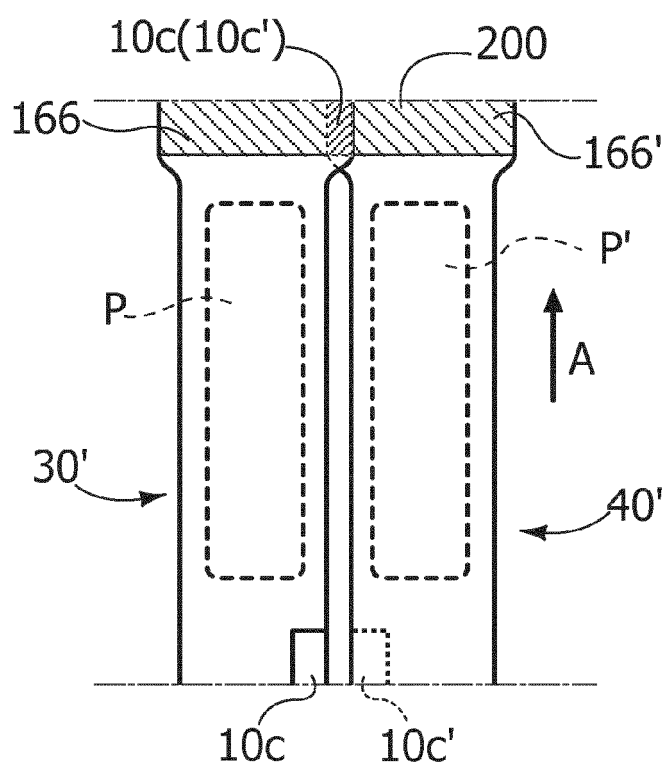


FIG. 9

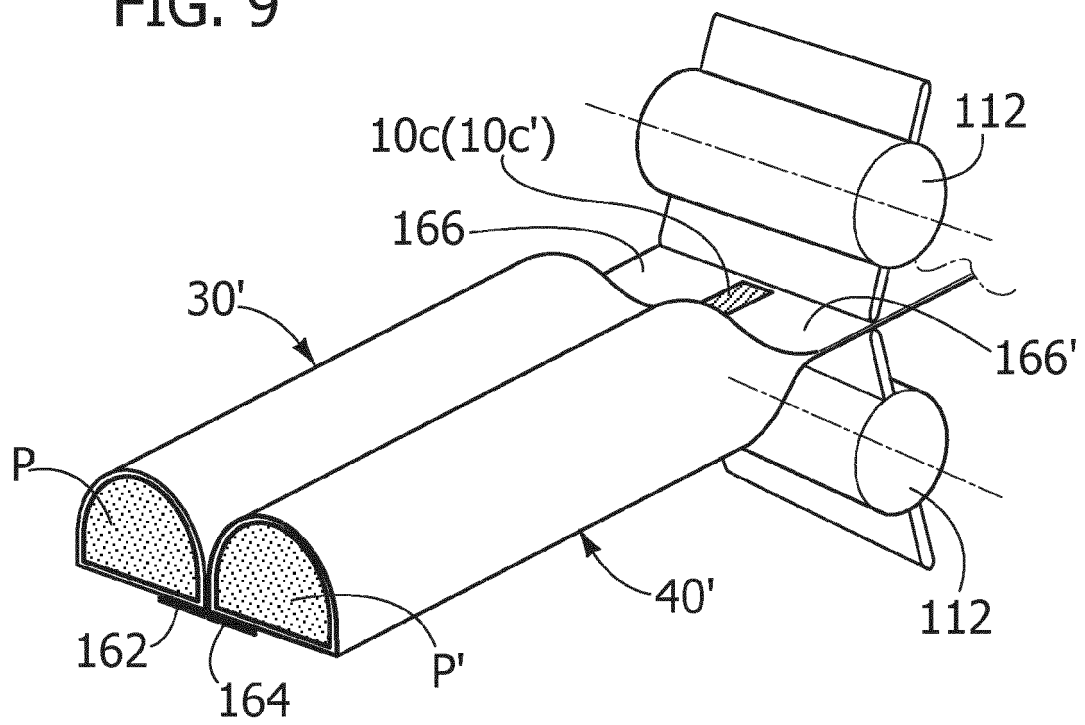


FIG. 10

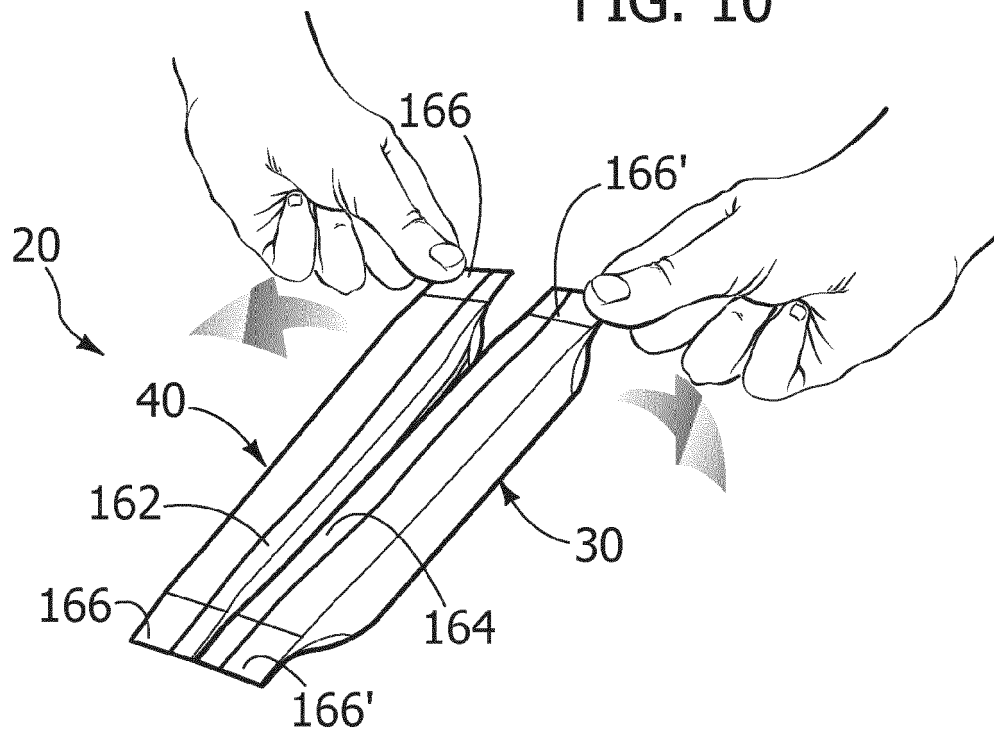
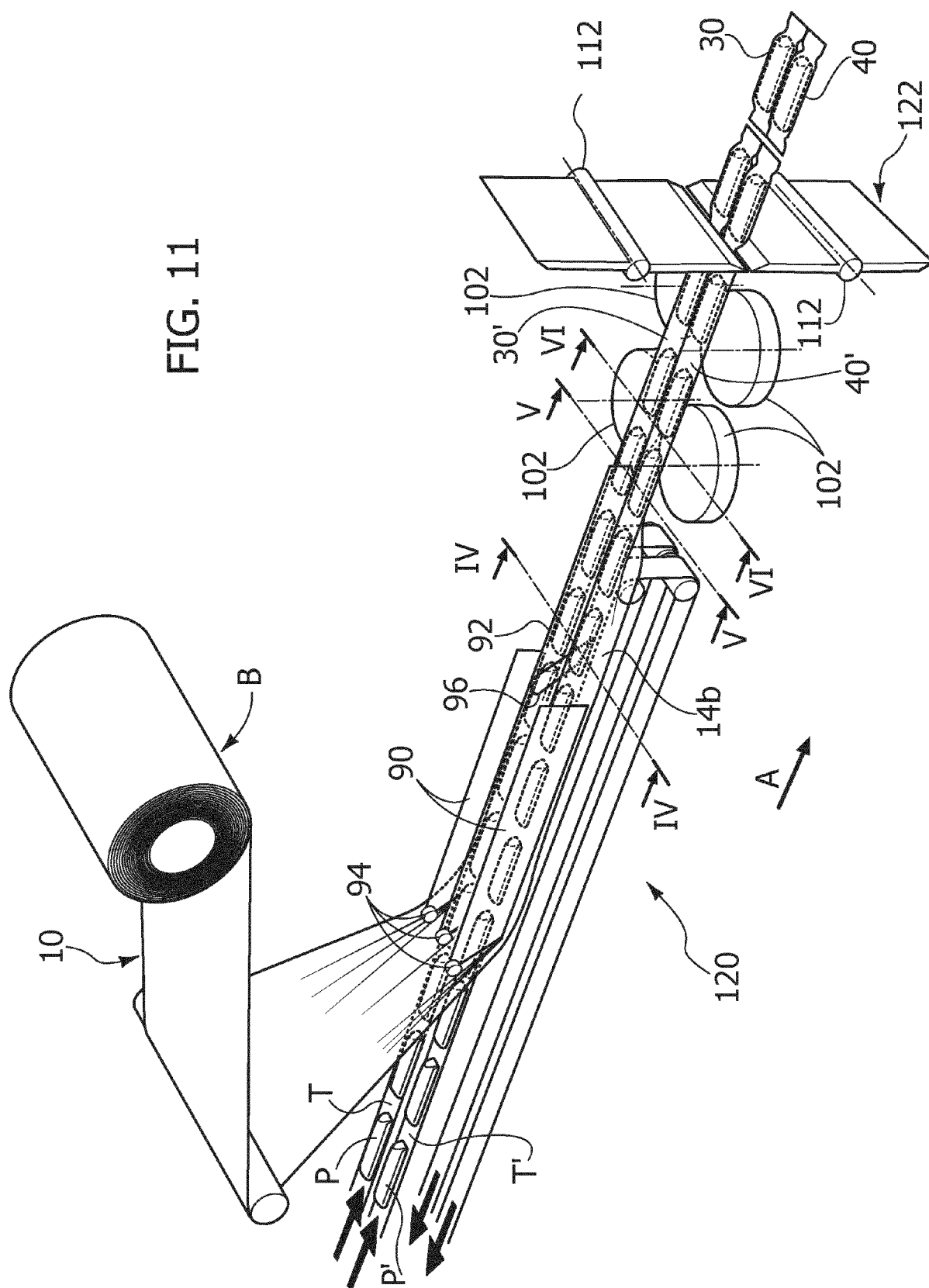


FIG. 11





EUROPEAN SEARCH REPORT

Application Number
EP 12 15 1989

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	GB 2 246 999 A (FOOD MACHINERY DESIGN LTD [GB]) 19 February 1992 (1992-02-19) * the whole document *	1-14	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65B B65D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 26 March 2012	Examiner Lawder, M
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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26-03-2012

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		WO 2009122244 A1	08-10-2009

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