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(72) Inventors:
• **YERA MONTOYA, Carlos**
08221 TERRASSA (ES)
• **CUADRAT PÉREZ, Guillem**
08211 CASTELLAR DEL VALLÈS (ES)

(74) Representative: **Sugrañes, S.L.P.**
Calle Provenza 304
08008 Barcelona (ES)

(71) Applicant: **Volpak, S.A.U.**
08130 Santa Perpetua De Mogoda (ES)

(54) **FOLDING DEVICE**

(57) The present invention relates to a folding device (1) intended to fold a continuous web (100) of flexible material on itself which is made to pass therethrough, with a main folder (2) and an auxiliary folder (3), aligned, both inscribed in planes perpendicular to a reference plane (Y) and positioned forming an angle (α) with each other, the main folder (2) having an essentially triangular

shape the sides of which, converging towards the reference plane (Y) without meeting each other, determine a set of first folding edges (21) which are movably mounted on the body of the main folder (2), such that the coordinated movement thereof towards or in the opposite direction to the reference plane (Y) enables the opening or closing of the triangle shape to be regulated and thus the width of a bottom portion (102) of the web that will be folded inwards by the auxiliary folder (3).

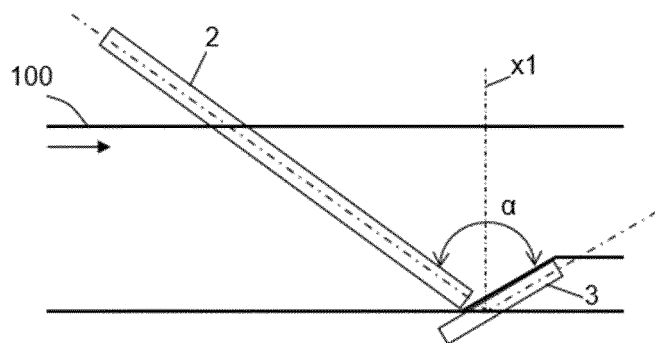


Fig. 1

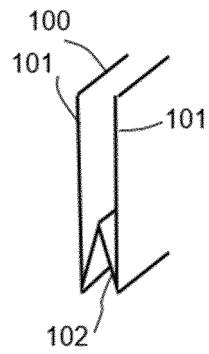


Fig. 3

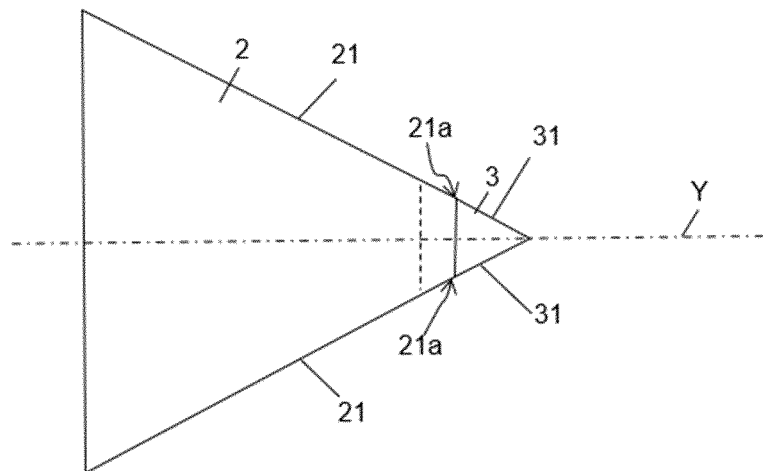


Fig. 2

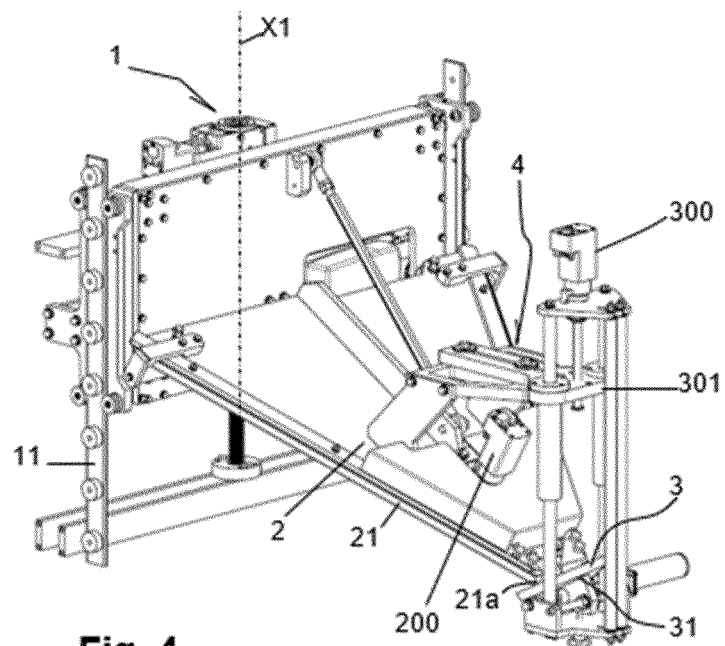


Fig. 4

Description

Technical field of the invention

[0001] The invention relates to a folding device especially suitable for folding a continuous webweb of flexible material on itself which is made to pass therethrough. Folding devices of this type are used in machines for manufacturing packaging from a continuous webweb of material, to fold the webweb and give it the suitable shape to manufacture successive packaging that will be individualised by transverse cutting of the webweb.

Background of the invention

[0002] In the field of manufacturing packaging from a continuous webweb of flexible material, machines are known with means for stretching the web from a web winding which is passed through successive work stations in order to fold it on itself along longitudinal folding lines and to subsequently perform a series of welding and cutting operations on the folded web, with the aim of first forming a sort of pockets with the web that determine container spaces and then individualise these containers to obtain packaging in the shape of bags.

[0003] To manufacture packaging able to stand upright or erect, it is known the technique of folding the web about three longitudinal folding lines to end up obtaining packaging in which two facing side walls are distinguished and joined seamlessly by a bottom portion folded towards the inside of the packaging. At a stage prior to the welding and cutting operations, the web will have a cross section with a generally W-shaped lower portion. Packaging of this type are sometimes referred to as "stand-up pouches" or "doypack".

[0004] To achieve this W-shape, folding devices can be used which have a main folder and an auxiliary folder positioned in a V in a forward direction of the web, in other words, forming an angle with each other, the main folder having an essentially triangular shape the sides of which, converging in the forward direction of the web, determine a set of first folding edges intended to gradually bend the web to face two longitudinal portions of the same connected by the bottom portion and the auxiliary folder also having a triangular shape the sides of which, converging in the forward direction of the web, determine a set of second folding edges the function of which is to gradually bend the bottom portion towards the inside of the web. For this purpose, the triangle shape of the main folder is truncated and the auxiliary folder is adjusted next to the main folder, with just enough space so that the aforementioned bottom portion of the web can pass between both main and auxiliary folders, and such that the auxiliary folder completes the truncated triangle shape of the main folder.

[0005] The degree to which the triangle shape of the main folder is truncated will determine the width of the bottom portion. In turn, the auxiliary folder must fold this

bottom portion towards the inside of the gradually facing walls of the web.

[0006] This entails that, when the format of the packaging to be manufactured must be changed, especially when the width of the bottom portion of the same must be changed, the truncated shape of the main folder must be altered and, in turn, the relative position between the main folder and the auxiliary folder must be corrected so that the second completes the new truncated triangle shape of the main folder.

[0007] A main objective of the invention is a device that makes it easier to carry out these operations, that is, it makes it easier to perform a change of format of the manufactured packaging. Another objective of the invention is a device that enables these operations to be automated. A constructively simple, as well as robust and efficient technical solution is desirable.

[0008] At present, the known solutions when a change of format is required consist of building the main folder in such a way that it has a fixed portion and one or more replaceable or insert portions. The fixed portion has the shape of a truncated triangle and the replaceable portion is coupled to the area that would complete said triangle in order to extend said figure of an also truncated triangle, but to a greater or lesser extent.

[0009] These solutions have several drawbacks. It should be noted that it is necessary to have a set of replaceable portions, each one according to a width for a bottom portion of the packaging to be manufactured and therefore it will enable a discreet adjustment not for any width of the bottom portion. In addition, the replacement of the replaceable portion requires accessing the portion of the main folder and the coupling means that enable the new replaceable portion to be removed and positioned, having to stop the machine and/or having to perform this operation when empty, that is without the web going through the folding device. This leads to technical shutdowns and a decrease in productivity.

[0010] Also, as explained before, a new truncated triangle figure entails changing the relative position between the main folder and the auxiliary folder. This operation is usually performed manually and, even though the movement of the folders can be guided, the ideal positioning of the same is not guaranteed if the replaceable portion has not been correctly positioned in the main folder and/or if the relative position between the main and auxiliary folders is not the one that corresponds so that the second completes the truncated triangle figure of the first.

Description of the invention

[0011] The proposed folding device comprises, in a manner known *per se*, in a forward direction of the web to be folded, a main folder and an auxiliary folder, aligned, both inscribed in planes perpendicular to a reference plane and positioned forming an angle with each other, the main folder having an essentially triangular shape

the sides of which, converging towards the reference plane without meeting each other, determine a set of first folding edges intended to gradually bend the web to face two longitudinal portions of the same connected by a bottom portion; and the auxiliary folder having a triangular shape the sides of which, converging on the reference plane, determine a set of second folding edges intended to gradually bend the bottom portion towards the inside of the web.

[0012] In essence, the device is characterised in that the aforementioned first folding edges are movably mounted on the body of the main folder such that the coordinated movement thereof towards or in the opposite direction to the reference plane, and therefore the move towards or away each other of the ends of the first folding edges, enables the opening or closing of the triangle shape to be regulated and thus the width of the bottom portion of the web; and in that the device comprises positioning means for positioning the main and auxiliary folders such that each of the ends of the first folding edges of the main folder adjust over a respective second folding edge of the auxiliary folder.

[0013] By means of the device of the invention it is thus possible to carry out a change of format of the packaging to be manufactured without having to replace any component. By simply sliding the first folding edges towards or in the opposite direction to the reference plane, it is possible to vary the truncated triangle shape of the main folder. Since the device also has means to correct the relative position of the main and auxiliary folders so that the second completes the triangle figure of the first, the change of format can be performed with precision and, if required, it can be easily automated.

[0014] Thus, in a variant of the invention, the main folder mounts a main motor group coupled to a transmission mechanism able to move the first folding edges in unison towards or in the opposite direction to the reference plane, in other words, towards or in the opposite direction to the imaginary vertex of the triangular shape.

[0015] According to one embodiment, the main motor group has an output shaft normal to the plane of the main folder and the transmission mechanism interlocks with said output shaft with two rack and pinion systems, each one associated with a first folding edge, such that the rotation of the output shaft of the main motor group in a first direction or in the opposite direction transmits a linear movement towards or away each other of the said first folding edges.

[0016] This embodiment enables the sliding of the first folding edges to be synchronised, ensuring that the symmetry thereof with respect to the reference plane is kept.

[0017] In a variant of the invention, each first folding edge is actually formed by two complementary and linked portions, with interposition of the body of the main folder, by a series of pins that pass through respective sliders formed in the body of said main folder.

[0018] In a preferred variant, these pins serve as a support for a friction bearing of a wheel dimensioned accord-

ing to that of an associated slider, such that said wheel will roll inside the slider, between the ends thereof, when the sliding of the corresponding first folding edge is actuated.

5 **[0019]** This prevents wear on the movable portions of the device and in a simple way ensures that the first folding edges move with respect to the body of the main folder without the angle formed between them being altered.

10 **[0020]** The invention also envisages that the auxiliary folder is linked to the main folder able to move along an adjustment axis parallel to the bisector of the angle formed between the main and auxiliary folders. This enables the main and auxiliary folders to be oriented in unison to adapt to the dimensions of a new web while at the same time enabling the position of the auxiliary folder to be corrected with respect to the main folder when a change of format must be made.

15 **[0021]** In a variant, the device mounts an auxiliary motor group able to move the auxiliary folder along a system of guides oriented in the direction of said adjustment axis.

20 **[0022]** According to the aforementioned preference, the assembly formed by the auxiliary motor group and the guide system can be an assembly solidly attached to the main folder, such that a change in position of the main folder does not necessarily entail a change in the relative position between said main folder and the auxiliary folder, which enables the main and auxiliary folders to be oriented in space in unison.

25 **[0023]** In an embodiment of particular interest, the main and auxiliary motor groups can be actuated in coordination according to a coarse adjustment programme, such that a variation in the position of the first folding edges translates into an automatic movement of the auxiliary folder guided by the guide system so that the ends of the first folding edges of the main folder continue adjusting over the associated second folding edges of the auxiliary folder.

30 **[0024]** In any case, it is possible to program coordinated actuations for the main and auxiliary motor groups, so that a change of format of interest can be automated.

35 **[0025]** In a variant, the auxiliary folder is related to the guide system such that a fine adjustment with respect to the guide system is possible, in at least one direction transverse to the adjustment axis, regardless of the one that the auxiliary motor may provide along the guide system. This fine adjustment can be actuated manually or it can also be motorised.

40 **[0026]** According to another aspect of interest, in a variant of the invention the first folding edges mount respective complementary closing flaps at the convergent ends thereof, flaps which have respective front walls that overlap in sliding one behind the other to a greater or lesser extent according to the move towards or away of the ends of the first folding edges to form, together, a front closing wall of the main folder for better control of the folding of the bottom portion towards the inside of the web by the thrust effect of the auxiliary folder.

[0027] Advantageously, not only can the truncated triangle shape of the main folder be changed but, without the need for replacing components, it is also possible to frontally close the main folder such that there are no gaps or recesses between the converging ends of the first folding edges whatever the instantaneous position adopted by these first folding edges.

[0028] For the incorporation thereof into an automatic machine for manufacturing bags and for the correct feeding thereof with a stretched web from a winding or similar, in a variant of the invention the device comprises a support chassis and the assembly formed by the main folder and the auxiliary folder is movably mounted along a height adjustment axis parallel to the bisector of the angle formed between the main and auxiliary folders.

[0029] It is also envisaged that the assembly formed by the main folder and the auxiliary folder is movably mounted along a centring axis perpendicular to the height adjustment axis.

[0030] In a variant, the triangle shape of the main and auxiliary folders is symmetrical with respect to the reference axis.

Brief description of the drawings

[0031]

Figures 1 and 2 are schematic figures showing the arrangement and relationship between a main folder and an auxiliary folder to produce a combined effect in a flexible continuous web when it is made to pass through the folders;

Figure 3 shows a schematic view of the general shape had by the cross section of the web at the output of the auxiliary folder;

Figures 4 and 5 show respective front and rear perspective views of a folding device according to the invention;

Figure 6a shows the folding device with the main and auxiliary folders adopting a first relative position, to fold a web according to the way illustrated in Figure 6b, taking into account a first packaging format to be manufactured;

Figure 7a shows the folding device with the main and auxiliary folders adopting a second relative position, to fold the same web according to the way illustrated in Figure 7b, taking into account a second packaging format to be manufactured; Figure 8 is a detailed view of the transmission mechanism able to move in unison the first folding edges of the main folder towards or in the opposite direction to the reference plane or, in other words, towards or in the opposite direction to the imaginary meeting vertex thereof; Figures 9a and 9b are detailed views of the main folder, illustrating how the closing flaps that mount the first folding edges at the converging ends thereof complement each other to form, together, a front closing wall of the main folder; and

Figure 10 shows a solution for the guided coupling of the first folding edges to the body of the main folder.

5 Detailed description of an embodiment

[0032] Figures 1 and 2 show a schematic elevation and plan view, respectively, of a set of folders formed by a main folder 2 and an auxiliary folder 3 and the combined effect they produce on a continuous web 100 of flexible material that is made to pass therethrough in a horizontal direction and in a forward direction towards the right in the figures. Figure 3 illustrates the general shape that the web 100 will adopt at the output of the auxiliary folder 3.

[0033] It should be mentioned that these schematic figures, as well as the drawings of the device 1 that will follow to exemplify the invention, are only used to explain the operation of the invention. Therefore, when orientation qualifiers are used in the present description, with terms such as "horizontal", "vertical", etc., or relative position qualifiers, with terms such as "above", "below", etc., these are solely used as reference, unless otherwise stated, to the orientation of the figures and drawings, the device that is the object of the present invention being able to be arranged in other different orientations.

[0034] As Figures 1 and 3 show, the main folder 2 and the auxiliary folder 3 are arranged aligned, both inscribed in planes perpendicular to a reference plane Y positioned forming an angle α with each other.

[0035] The angle α can be selected according to different parameters. In general, angles comprised between 100° and 120° are used.

[0036] The main folder 2 has an essentially triangular shape the sides of which, converging towards the reference plane Y, determine a set of first folding edges 21 intended to gradually bend the web 100 to face two longitudinal portions 101 of the same connected by a bottom portion 102. In turn, the auxiliary folder 3 has a triangular shape the sides of which, converging in the reference plane Y, determine a set of second folding edges 31 intended to gradually bend the bottom portion 102 marked by the converging ends 21a of the folding edges 21 of the main folder 2 towards the inside of the web 100.

[0037] To this end, the triangle shape of the main folder 2 is a truncated triangle figure and the auxiliary folder 3 must be adjusted to the main folder such that it leaves just enough space for the bottom portion 102 of the web 100 to slide between the main 2 and auxiliary 3 folders and also such that (see Figure 2) the triangle shape of the auxiliary folder 3 completes the truncated triangle shape of the main folder 2.

[0038] The folding device 1 of the invention is a device prepared to automate a change of format in the packaging to be manufactured from the web 100, which in practice enables this relationship between the main 2 and auxiliary 3 folding triangles to be kept when the truncated triangle shape of the main folder 2 is changed. Further-

more, the device 1 of the invention enables this truncated triangle shape to be changed without the need to change or replace components of the device 1.

[0039] This device 1 comprises, now referring to Figures 4 and 5, a support chassis 11 to which the assembly formed by the main folder 2 and the auxiliary folder 3 are mounted able to move along a height adjustment axis X1, parallel to the bisector of the angle α formed between the main 2 and auxiliary 3 folders, both X1 and said bisector being oriented vertically in the example.

[0040] Likewise, the assembly formed by the main folder 2 and the auxiliary folder 3 is also mounted able to move along a centring axis B1 (see Figure 5) perpendicular to the height adjustment axis X1 and consequently oriented horizontally in the example.

[0041] The support of an assembly formed by a main folder 2 and an auxiliary folder 3 analogous to those explained herein able to move in two orthogonal directions on a chassis, coinciding with a vertical direction and a horizontal direction, is known and for this reason is not described in more detail.

[0042] However, it is characteristic of the device 1 that the first folding edges 21 are movably mounted on the body of the main folder 2, such that the coordinated movement thereof towards or in the opposite direction to the reference plane Y, and therefore the move towards or away of the converging ends 21a of these first folding edges 21, enables the opening or closing of the truncated triangle shape to be regulated and thus the width of the bottom portion 102 of the web 100, in practice determined by the distance that separates said ends 21a of the first folding edges.

[0043] The main folder 2 can thus be easily adapted to mark bottom portions of various dimensions on a web, for example, between 34 mm and 125 mm, without being subject to predetermined or specific values within this range, contrary to what occurs when the distance that separates the converging ends of the folding edges of a main folder is determined by a removable, replaceable or interchangeable component.

[0044] The device 1 further comprises positioning means 4 for positioning the main 2 and auxiliary 3 folders such that each of the ends 21a of the first folding edges 21 of the main folder 2 adjust over a respective second folding edge 31 of the auxiliary folder 3 such that, as it had been introduced with the support of Figure 2, the triangle shape of the auxiliary folder 3 completes the truncated triangle shape of the main folder 2.

[0045] On the one hand, to achieve the movement of the folding edges 21 with respect to the main body of the main folder 2, as shown in Figure 8, the main folder 2 mounts a main motor group 200 coupled to a transmission mechanism 201 able to move in unison said first folding edges 21 towards or in the opposite direction to the reference plane Y or, in other words, towards or in opposite direction to the imaginary vertex of the triangular shape.

[0046] This main motor group 200 has an output shaft

202 normal to the plane of the main folder 2 and the transmission mechanism 201 interlocks with said output shaft 202 with two rack and pinion systems 204a, 204b and 205a, 205b, each one associated with a first folding edge 21 such that the rotation of the output shaft 202 of the main motor group 200 in a first direction or in the opposite direction transmits a linear movement towards or away each other of the said first folding edges 21 in the direction indicated by the arrows in Figure 8.

[0047] In the example, the output shaft 202 is coupled to one of a set of two interlocked wheels 206, such that the direct actuation of one of the interlocked wheels 206 in one direction of rotation will produce the driven rotation of the other one of the interlocked wheels 206 in the opposite direction. The rotation of each one of these interlocked wheels 206 is transmitted to one of the aforementioned rack and pinion systems 204a, 204b and 205a, 205b to cause an associated folding edge 21 to slide.

[0048] Figures 9a and 9b serve to illustrate that the device 1 also incorporates means for frontally closing the main folder 2, which favours the correct transition of the web between the main folder 2 and the auxiliary folder 3 and prevents the formation of wrinkles or other undesirable effects in the web during this transition.

[0049] To guarantee the aforementioned closure of the main folder 2 regardless of the instantaneous position adopted by the first folding edges 21, these first folding edges 21 mount respective complementary closing flaps 22, 23 at the convergent ends 21a thereof, flaps with respective front walls 22a, 23a that overlap in sliding one behind the other to a greater or lesser extent according to the move towards or away of the ends 21a of the first folding edges 21. The overlap of the front walls 22a, 23a determines a front closing wall without interruption of the main folder 2 for better control of the folding of the bottom portion 102 towards the inside of the web 100 by the thrust effect of the auxiliary folder 3.

[0050] Figure 10 shows an exploded view of a mechanical solution for the slidable and guided coupling of the folding edges 21 to the body of the main folder 2.

[0051] According to this solution, each folding edge 21 is actually formed by two complementary portions, linked together with interposition of the body of the main folder 2: a first portion 210 of machined general L-shaped cross section so that the web 100 can slide supported on the outer surfaces thereof; and a second closing portion 211 that will incorporate or to which the corresponding rack 204b will be firmly attached.

[0052] In order to link each first folding edge 21 to the body of the main folder 2, this is equipped with at least two sliders 214 (three, in the example of Figure 10) that are crossed by corresponding pins 213 solidly attached to either one of the two portions that form the first folding edge 21, in the example solidly attached to the first portion 210 thereof, the distal ends of which will be fixed to the other one of the two portions by any conventional means, for example by means of clamping screws or threaded plugs 217 packing a set formed by a friction

bearing 215, crossed by the pin 213, which enables the rotation of a wheel 216 dimensioned according to an associated slider 214, which will roll inside of said slide when the sliding of the first folding edge 21 is actuated.

[0053] Figures 6a and 7a show the device 1 with the main folder 2 adopting two different shapes, in other words, determining two truncated triangle shapes in the second case with the ends 21a of the first folding edges 21 further away from each other compared to the first case, which enables the height of the fold in the folded web 100 to be increased or, in other words, the width of the bottom portion 102 to be increased as shown in Figures 6b and 7b, respectively.

[0054] On the other hand, Figures 6a and 7a also serve to show the necessary change in relative position between the main 2 and auxiliary 3 folders and how the device 1 is prepared for it. In the example, the auxiliary folder 3 is moved in height to make each of the ends 21a of the first folding edges 21 of the main folder 2 coincide on a respective second folding edge 31 of the auxiliary folder 3.

[0055] To this end, in device 1 the auxiliary folder 3 is linked to the main folder 2 able to move along the adjustment axis x1 parallel to the bisector of the angle α formed between the main and auxiliary folders 2, 3, this adjustment axis x1 being oriented vertically in the example. To guide this movement, the device 1 is equipped with a guide system 301 oriented in the direction of said adjustment axis x1.

[0056] In particular, the device 1 mounts fixed with respect to the body of the main folder 2 a bridge 310 that supports two through guide elements 301a, axially parallel with respect to the adjustment axis x1 and each one crossed by a supportive rod 311 of the auxiliary folder 3. Threadedly coupled to the bridge 310 is a spindle 312, the rotation of which will cause the auxiliary folder 3 to be raised or lowered with respect to the bridge 310 and thus with respect to the main folder 2.

[0057] Furthermore, in this case, the device 1 mounts an auxiliary motor group 300 for actuating the spindle 312.

[0058] Obviously, other mechanical solutions are possible to produce a guided movement of the auxiliary folder 3 with respect to the main folder 2.

[0059] It is, however, of interest that the assembly formed by the auxiliary motor group 300 and the guide system 301 is an assembly solidly attached to the main folder 2, such that a change in position of the main folder 2, in this case for example along any of the height adjustment axis X1 or the centring axis B1, does not entail a change in the relative position between said main folder 2 and the auxiliary folder 3, which enables the main and auxiliary folders 2, 3 to be oriented in space in unison.

[0060] The equipping of the device 1 with the main 200 and auxiliary 300 motor groups enables a coordinated actuation to be programmed according to one or more coarse adjustment programmes, such that a variation in the position of the first folding edges 21 is translated into

an automatic movement of the auxiliary folder 3 guided by the guide system 301, so that the ends 21a of the first folding edges 21 of the main folder 2 continue adjusting over the associated second folding edges 31 of the auxiliary folder 3.

[0061] Notwithstanding the foregoing, the auxiliary folder 3 is preferably related to the guide system 301, where appropriate with the supportive rods 311, such that a fine adjustment with respect to the guide system is possible in at least one direction transverse to the adjustment axis x1, in what would be a horizontal direction herein, for example to regulate the centring of the auxiliary folder 3 with respect to the reference plane Y, regardless of the coarse, vertical adjustment that the auxiliary motor 300 may provide. In the example, this adjustment is implemented by measuring a spindle actuated by a motor 313 (in other variants it could be manually actuated by means of an actuation lever or knob).

[0062] Misalignments between the longitudinal portions 101 of the web 100 (future side walls of the packaging) or of the central fold of the bottom portion 102 can be detected by means of measurements performed on the web as it is folded or already folded at the output of the assembly formed by the main folder 2 and the auxiliary folder 3, only by way of example, by means of photocells or the like.

[0063] These measurements will generate movement instructions, along the centring axis B1 perpendicular to the height adjustment axis X1, of the main folder 2 and/or the auxiliary folder 3.

Claims

1. A folding device (1), intended to fold a continuous web (100) of flexible material on itself which is made to pass therethrough, usable in machines for manufacturing packaging from a continuous web of material, said device comprising in a forward direction of the web a main folder (2) and an auxiliary folder (3), aligned, both inscribed in planes perpendicular to a reference plane (Y) and positioned forming an angle (a) with each other,

- the main folder (2) having an essentially triangular shape the sides of which, converging towards the reference plane (Y) without meeting each other, determine a set of first folding edges (21) intended to gradually bend the web (100) to face two longitudinal portions (101) of the same connected by a bottom portion (102);
- the auxiliary folder (3) having a triangular shape the sides of which, converging in the reference plane (Y), determine a set of second folding edges (31) intended to gradually bend the bottom portion (102) towards the inside of the web (100); the device being characterised in that
- the first folding edges (21) are movably mount-

- ed on the body of the main folder (2), such that the coordinated movement thereof towards or in the opposite direction to the reference plane (Y), and therefore the move towards or away each other of the converging ends (21a) of the first folding edges (21), enables the opening or closing of the triangle shape to be regulated and thus the width of the bottom portion (102) of the web; and **in that**
- the device comprises positioning means (4) for positioning the main (2) and auxiliary (3) folders such that each of the ends (21a) of the first folding edges (21) of the main folder (2) adjust over a respective second folding edge (31) of the auxiliary folder (3).
2. The folding device (1) according to claim 1, **characterised in that** the main folder (2) mounts a main motor group (200) coupled to a transmission mechanism (201) able to move in unison the first folding edges (21) towards or in the opposite direction to the reference plane (Y).
 3. The folding device (1) according to claim 2, **characterised in that** the main motor group (200) has an output shaft (202) normal to the plane of the main folder (2) and the transmission mechanism (201) interlocks with said output shaft (202) with two rack and pinion systems (204a, 204b; 205a, 205b), each one associated with a first folding edge (21) such that the rotation of the output shaft (202) of the main motor group (200) in a first direction or in the opposite direction transmits a linear movement towards or away each other of the said first folding edges (21).
 4. The folding device (1) according to any one of the preceding claims, **characterised in that** each first folding edge (21) is actually formed by two complementary and linked portions (210, 211), with interposition of the body of the main folder (2), by a series of pins (213) that pass through respective sliders (214) formed in the body of said main folder (2).
 5. The folding device (1) according to the preceding claim, **characterised in that** the pins (213) serve as a support for a friction bearing (215) of a wheel (216) dimensioned according to that of an associated slider (214), such that said wheel will roll inside the slider when the sliding of the corresponding first folding edge (21) is actuated.
 6. The folding device (1) according to any one of the preceding claims, **characterised in that** the auxiliary folder (3) is linked to the main folder (2) able to move along an adjustment axis (x1) parallel to the bisector of the angle (a) formed between the main and auxiliary folders (2, 3).
 7. The folding device (1) according to the preceding claim, **characterised in that** it mounts an auxiliary motor group (300) able to move the auxiliary folder (3) along a system of guides (301) oriented in the direction of said adjustment axis (x1).
 8. The folding device (1) according to the preceding claim, **characterised in that** the assembly formed by the auxiliary motor group (300) and the guide system (301) is an assembly solidly attached to the main folder (2), such that a change in position of the main folder (2) does not necessarily entail a change in the relative position between said main folder (2) and the auxiliary folder (3), which enables the main and auxiliary folders (2, 3) to be oriented in space in unison.
 9. The device (1) according to claims 2 and 7, **characterised in that** the main (200) and auxiliary (300) motor groups can be actuated in coordination according to a coarse adjustment programme, such that a variation in the position of the first folding edges (21) translates into an automatic movement of the auxiliary folder (3) guided by the guide system (301), so that the ends (21a) of the first folding edges (21) of the main folder (2) continue adjusting over the associated second folding edges (31) of the auxiliary folder (3).
 10. The device (1) according to the preceding claim, **characterised in that** the auxiliary folder (3) is related to the guide system (301) such that a fine adjustment with respect to the guide system is possible, in at least one direction transverse to the adjustment axis (x1), regardless of that one that the auxiliary motor (300) may provide along the guide system (301).
 11. The device (1) according to any one of the preceding claims, **characterised in that** the first folding edges (21) mount respective complementary closing flaps (22, 23) at the convergent ends (21a) thereof, flaps with respective front walls (22a, 23a) that overlap in sliding one behind the other to a greater or lesser extent according to the move towards or away each other of the ends (21a) of the first folding edges (21) to form, together, a front closing wall of the main folder (2) for better control of the folding of the bottom portion (102) towards the inside of the web (100) by the thrust effect of the auxiliary folder (3).
 12. The device (1) according to any one of the preceding claims, **characterised in that** it comprises a support chassis (11) and **in that** the assembly formed by the main folder (2) and the auxiliary folder (3) is movably mounted along a height adjustment axis (X1) parallel to the bisector of the angle (a) formed between the main (2) and auxiliary (3) folders.

13. The device (1) according to the preceding claim,
characterised in that the assembly formed by the
main folder (2) and the auxiliary folder (3) is movably
mounted along a centring axis (B1) perpendicular to
the height adjustment axis (X1). 5
14. The device (1) according to any one of the preceding
claims, **characterised in that** the triangle shape of
the main (2) and auxiliary (3) folders is symmetrical
with respect to the reference axis (Y). 10

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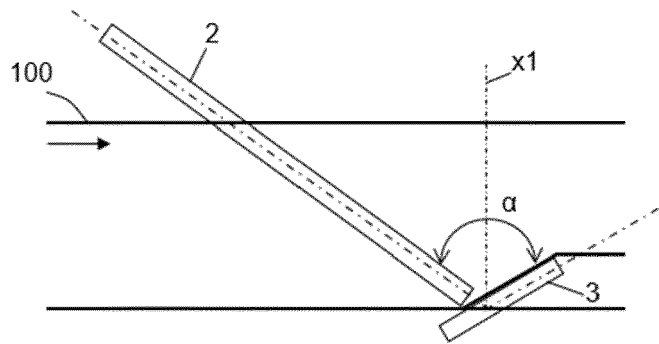


Fig. 1

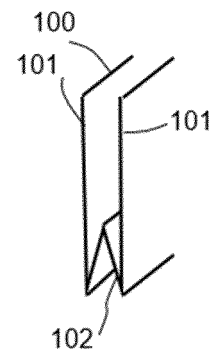


Fig. 3

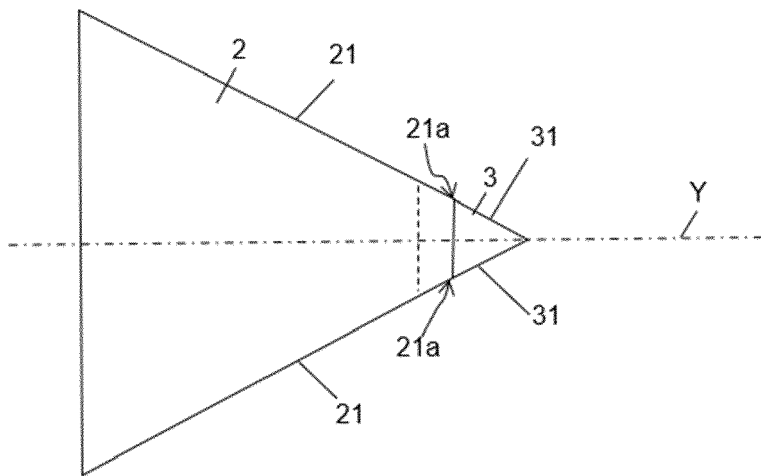


Fig. 2

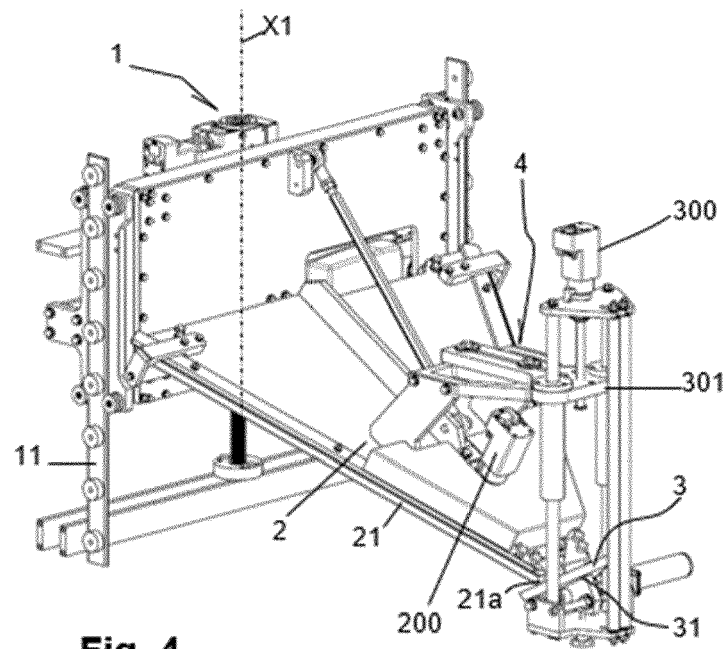


Fig. 4

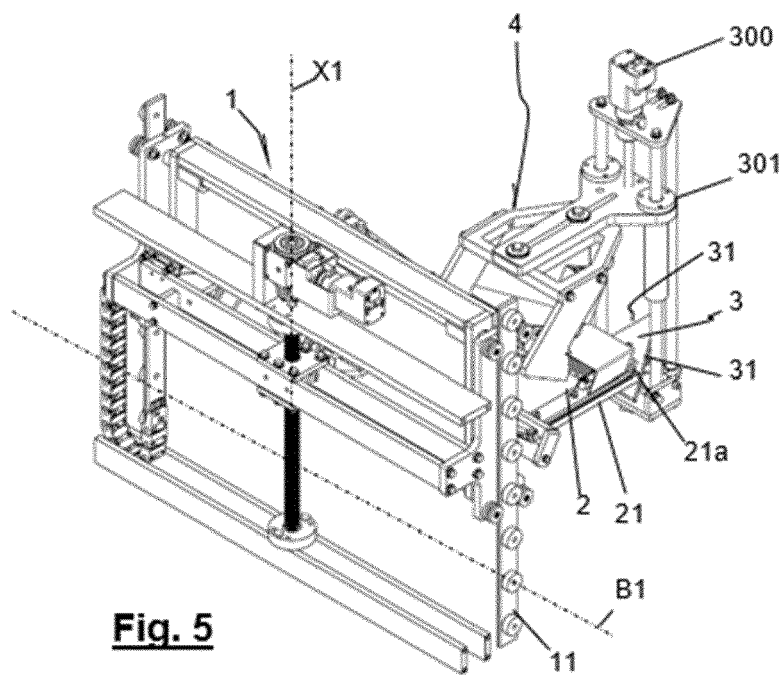
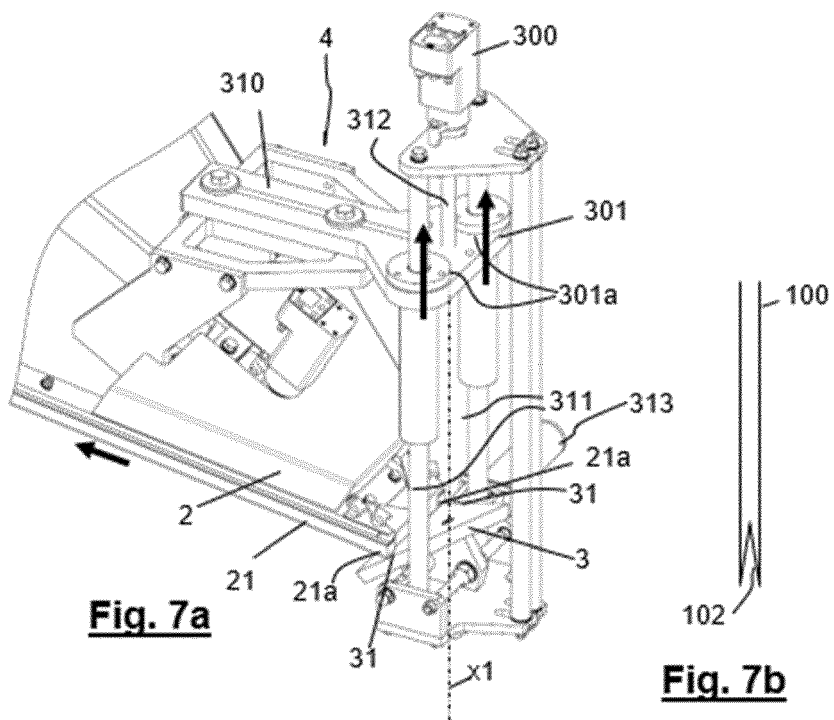
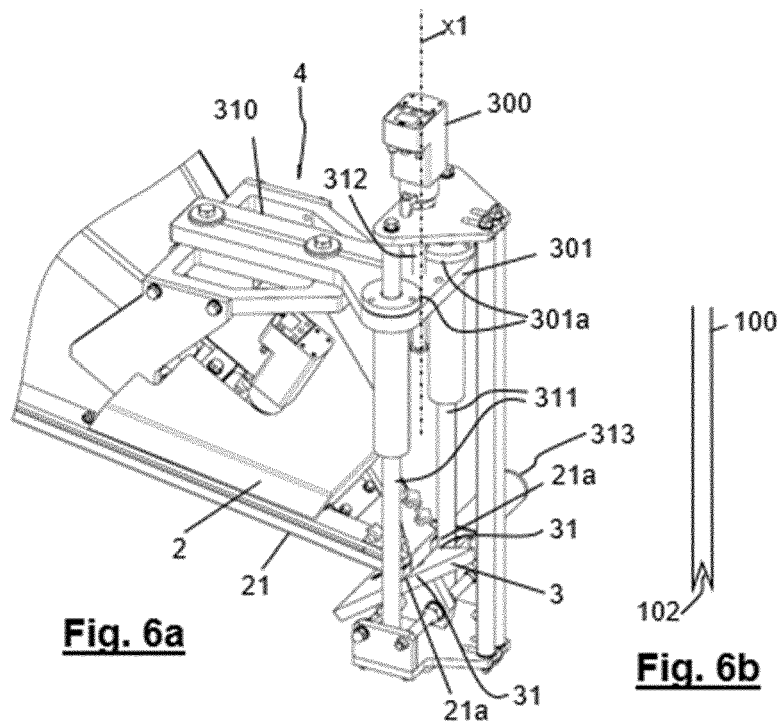


Fig. 5



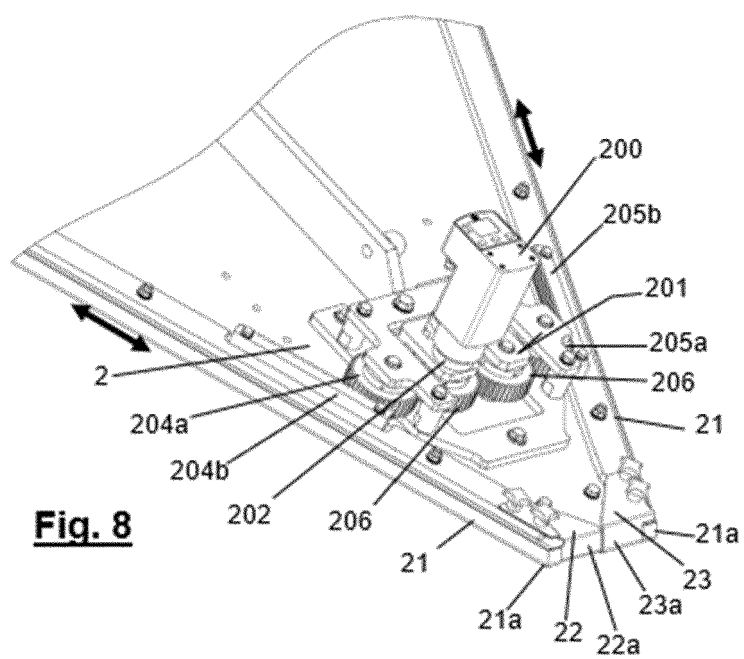


Fig. 8

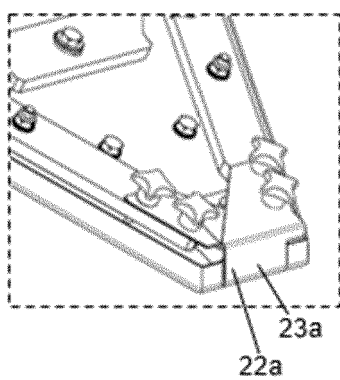


Fig. 9a

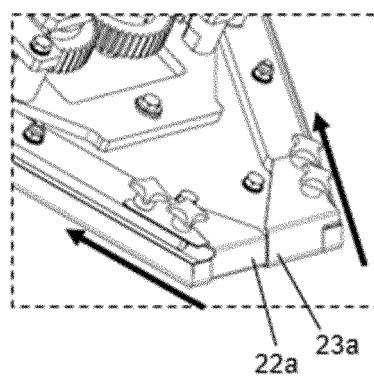


Fig. 9b

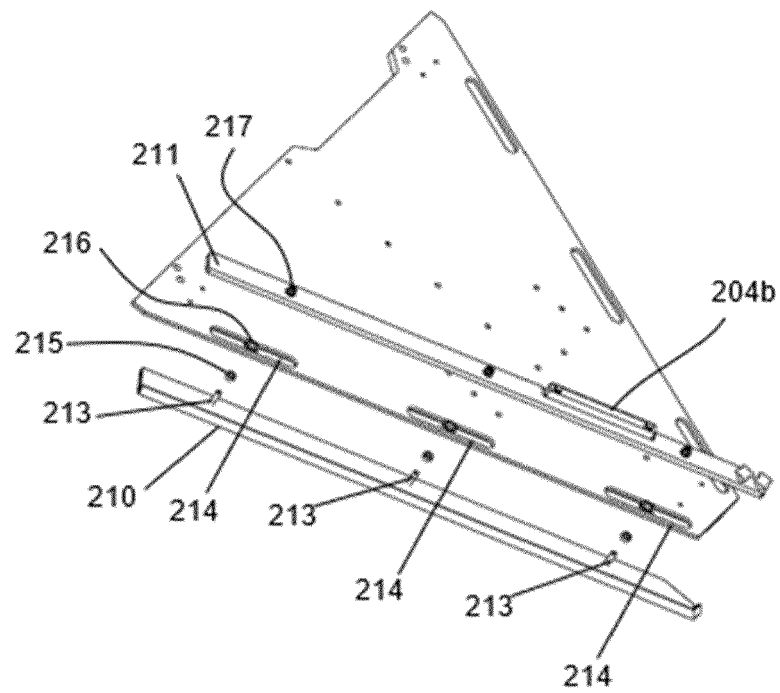


Fig. 10



EUROPEAN SEARCH REPORT

Application Number
EP 21 38 2527

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A	* the whole document *	4,5,11	
A	EP 2 692 649 A1 (MESPACK S L [ES]) 5 February 2014 (2014-02-05)	2,3, 6-10,12, 13	
	* the whole document *		
			TECHNICAL FIELDS SEARCHED (IPC)
			B65H B31B B65D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 29 November 2021	Examiner Ureta, Rolando
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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The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

29-11-2021

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		ES 2441465 A2	04-02-2014

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