



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
13.04.2011 Bulletin 2011/15

(51) Int Cl.:
B65B 9/08 (2006.01) **B31B 19/90** (2006.01)
B65D 33/25 (2006.01) **B65D 75/00** (2006.01)
B65B 61/18 (2006.01)

(21) Application number: **09398011.8**

(22) Date of filing: **07.10.2009**

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

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(54) **Method and apparatus for manufacturing and filling flexible containers as well as the container obtained**

(57) Method and apparatus for the production of flexible containers starting from a flat flexible sheet, and the

subsequent packaging of material by filling and closure of the said container. The flexible container produced according to the method, is also claimed.

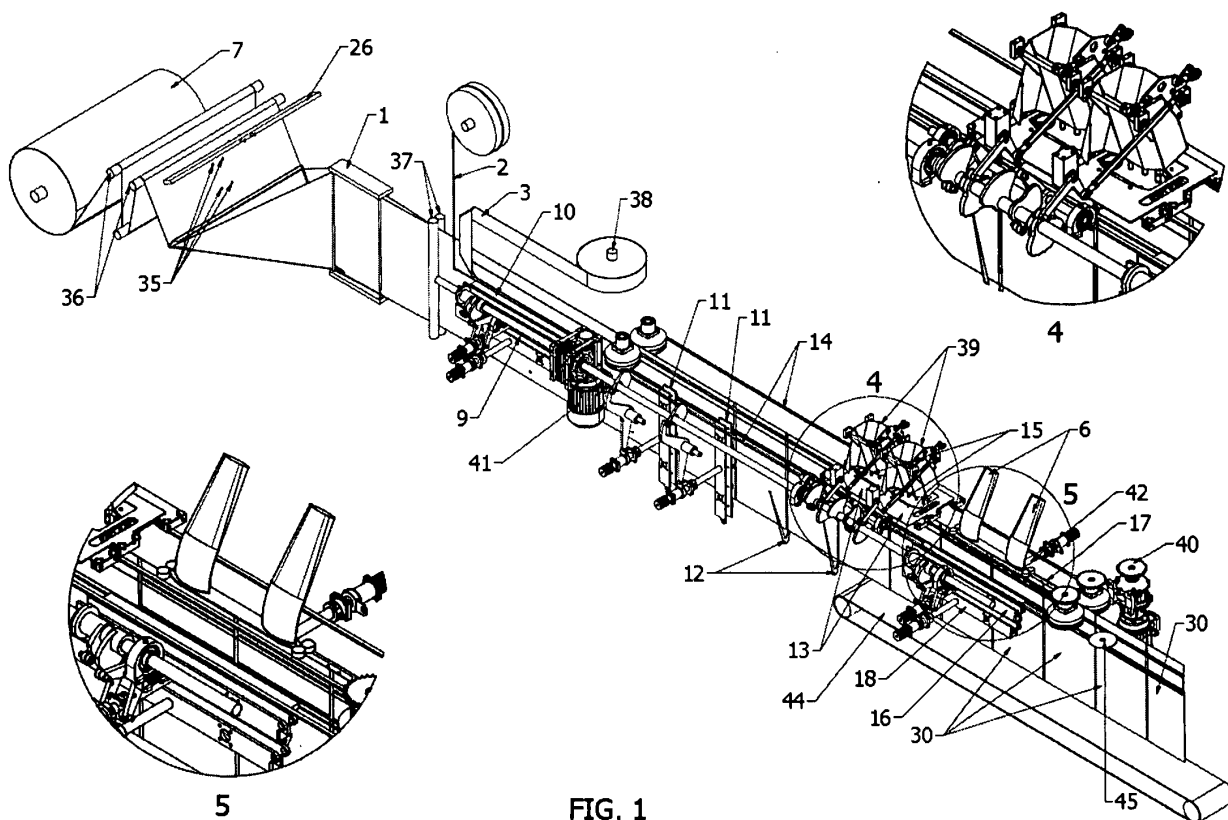


FIG. 1

Description

[0001] The invention refers to a method and apparatus for packaging any kind of product in flexible containers and containers thereof.

[0002] The apparatus of this invention is of an intermittent type. This means that the flexible film used to form the containers stands still during the entire seal forming and product filling, and moves only afterwards to transport the film material to the next machine station.

[0003] The apparatus can be animated through pneumatic, electric, hydraulic or mechanic transmission mechanisms, being the forming/filling operation executed independently of the driving device.

[0004] The film material is wound on a reel, and can be flat or pre-folded. In both cases, idle or driven rollers unwind the material, and a braking device guarantees that the film is unwound in a controlled way.

[0005] In the case where the film is wound flat, it passes a single fold (pillow bag) or a "W" shaped triple fold (stand-up container). After folding, and prior to the point where the film is grabbed by the transport belts, an optional label and zipper can be inserted between the folded sides of the container.

[0006] Both the label and the zipper are pre-wound on independent reels, each one with its own unwinding mechanism, composed by idle and/or motorized rollers and a braking device to unwind the label and zipper in a controlled way. The unwinding of the label and zipper is synchronized with the unwinding of the film, so the unwinding speed is the same for all the components.

[0007] To prevent the label from falling, a longitudinal weld can be applied to one side of the container, welding one edge of the label to the inner surface of one of the container walls, a back plate must be inserted to separate the label and side to be welded from the opposite container side, otherwise the two sides and the label will be welded together, sealing the container.

[0008] In the same way, the zipper is welded to one side of the container.

[0009] The movement of the label weld bar, zipper weld bar, transverse seals, longitudinal seals, transverse cut, buffer doors, and container opening and closing is fully synchronized to optimise the performance of the apparatus. The role of the buffer doors (39) is to receive the product to be contained from the dosing system (volumetric, weighing or other) and to fully synchronize product drop into the container, on the moment where the opening device (13) opens the belts and the container. After these actions are completed, and when all sealing and cutting mechanisms retract to their idle positions, the film belts drag the film longitudinally at an extent of at least one entire container length, this being done with one container on each machine cycle. Doubling the number or transverse seal bars and cutters, and having two filling openings allows to make two containers on each machine cycle, and therefore the belts must move the container material by two container lengths, (the

number of containers produced per cycle is unlimited, depending only on the number of devices installed).

[0010] After the label and zipper welding stations, the film container material is grabbed by its upper edges (lips) between two transport belts. These belts will sustain and transport the material until the container is fully sealed and filled.

[0011] Below the transport belts on the tension pulley side, are placed the transverse weld bars and cutting blades that can be integrated in the same mechanism, or separated.

[0012] When the containers have transverse seal formed and cut, they are transported to the fill opening, which opens the container allowing the penetration of the product to be contained, and recloses the container, allowing this to be transported to the next station.

[0013] On the longitudinal weld station, a longitudinal weld is applied on top of the container, sealing it.

[0014] In the case where a label is applied, a second longitudinal seal is applied below the label, and if a zipper is present, a seal is also applied on the unwelded side of the zipper. These actions are also synchronized and made simultaneously (and not in a sequence as on label applications from prior art, this making the machine cycle much faster).

[0015] At this stage the seals are complete, and the remaining material connecting the adjacent containers is cut by one or two blades, this obtaining the individual containers at the end of the transport belts.

Technical field of the invention

[0016] The present invention relates to a container formed from a flexible flaccid heat-sealable sheet-like material (like PET), applicable for containing solid, granular or liquid products, said container comprising a hermetically sealed cavity designed to enclose the product contained in the container, which is formed from at least two side walls, which may have a base configured in such a way to allow the container to stand up, a closure device (e.g. ZIPPER®) to make the container reclosable, and /or a label contained inside the container, separated from the product cavity by a weld. Optional vacuum can be created inside said product cavity.

[0017] An apparatus and a method of packaging and the container thereof are also disclosed.

Background of the invention

[0018] Containers formed from flexible materials, which contain liquids, formless substances or solids, and the devices to produce said containers are well known. For example, fish or fish slices, granulated food, drink containers, cosmetics and many others. They are generally formed so they are shaped like a pillow, or can contain a base to allow the container to stand up right when full, and usually the container material is pre-printed. In cases where the container material is not printed,

an adhesive label is applied on the outside, or a discrete carton, paper or plastic label is inserted inside the container, being separated from the contained product by an extra seal.

[0019] A reclosable device can also be fit to the container to allow it to be resealable after the first use.

[0020] Vacuum can also be created inside the container, helping to increase life of perishable products.

[0021] The methods and apparatus to produce such containers are also widely known.

[0022] Vertical form-fill-seal machines (VFFS) form the container by folding a flat flexible material around a tube which diameter will determine the width of the container. A double horizontal seal is made simultaneously closing the top of the preceding container and the bottom of the following container. Product to be contained is dropped on the following container at this stage, and a reclosable device can also be fitted on the container.

[0023] This method is known to those of skilled in the art and described for example in U.S. pat. Nos. 4,589,247 (Tsuruta et al), U.S. pat. No. 4,656,818 (Shimoyama et al.), U.S. pat. No. 4,768,411 (Su), U.S. pat. No. 4,808,010 (Vopan), U.S. pat. No. 6,820,391 and U.S. pat. No. 4,750,313 (Rovema GmbH)

Horizontal form-fill-seal (HFFS) machines operate in a different way. A sheet of flaccid flexible material is folded forming the bottom of the container. The bottom of the container can also be shaped to form a base to allow the container to stand up. A reclosable device can also be welded to one side of the container. Transverse seal bars form the side welds of the container. The container is then opened by suction pads or pincers, filled with the product to be contained, and sealed with a horizontal weld.

**Examples of this art can be found on
WO2005/120960 (VOLPAK) and WO2007/031330 (VOLPAK).**

[0024] HFFS can also operate with pre-made container. In this case, bags or packs of containers connected together are fed into the apparatus, the fill opening is opened by a mechanical pincer or vacuum the product to be contained is inserted into the bag and this container is sealed.

[0025] Such machines, as described on WO02/070349 (Goglio) can also to make packaging in vacuum.

[0026] The advantage of pre-made containers is the quality of the seal, making said machines particularly adequate to pack in vacuum or to contain liquids.

[0027] The main disadvantage is the need to prepare the containers in advance, and higher cost compared to flat laminar material.

[0028] Another well-known type of HFFS uses belts to drive the container material through the machine (belt driven horizontal form-fill-seal or BDHFFS). On said machines (Fig. 5), usually the container material is present-

ed pre-folded on a reel (Fig. 5A) although some machines are fitted with a folding device, like HFFS (Fig. 5B). Transverse seal bars (100) weld the sides of the container, and separate then up to a certain height (101), and not straight to the top, like standard HFFS. The unsealed height (102) between the top of the container material and the top of the transverse seals is necessary to allow the material to go around a fixed fill opening (103), and the excess of material is cut after the product to be packed is inserted in the container and the container sealed (104). This excess of material is wasted (105), constituting one major disadvantage of this type of machines, which can waste as much as 20% of the packaging material with evident costs.

[0029] The excess of film also creates some wrinkles in the container material, while hanging on the filling station, making the execution of a perfect seal very difficult. It is common to have a few pores on the last longitudinal seal, allowing air to penetrate the container or liquids to pour out.

[0030] These machines are not suitable to pack liquids or packaging in vacuum due to the seal failure.

[0031] Said machines (BDHFFS) are mostly used in industries consuming comparatively cheaper container materials like the carrot packaging which are packed mainly on polyethylene material (PE).

[0032] Despite of these disadvantages BDHFFS machines are interesting due to their lower costs compared to HFFS and to the easiness in the change of container sizes, which involves the change of the forming tube on VFFS, an expensive apparatus requiring a skilled worker to carry the change, this taking in certain cases 30 minutes to fulfil. Another advantage of the BDHFFS against standard HFFS and VFFS is the possibility to support the container by its base during the filling and sealing process preventing these from bursting or perforating with product impact. VFFS machines are particularly sensitive to this due to the very high drop height. BDHFFS also support the container by its entire upper edge, and not only by the corners as on HFFS, ensuring safer operation when handling heavy containers. BDHFFS machines are known by handling easily containers of vegetables with 25Kg in perfect safety (see GILLENKIRCH, H-TECH).

[0033] All the methods described above use mainly pre-printed flexible material to form the container.

[0034] When smaller productions are required the costs of pre-impression are quite high, and it is common to apply a label to clear unprinted film, since labels are cheap to print in small quantities. Said labels can be of self-adhesive type, being applied at the outside of the container, exposed to water and friction, or can be in paper, carton or plastic inserted inside the container. In the latter case, the product to be contained is introduced inside the container, a first seal is made, the label is inserted above the first seal and a second seal is made above the label protecting it against friction or water damage, but makes the filling and labelling process very slow, reducing overall speed of the apparatus.

[0035] The apparatus and method, which are object of the present invention, provide solutions to the problems raised by the prior art. This is done by providing a method to eliminate waste of film on BDHFFS machines, and allowing a fast and reliable way of introducing a label inside the container, fitting a reclosable device and creating vacuum into the package. Moreover the container object of the present invention presents innovative ways of applying a label and a reclosable device.

Summary of invention

[0036] The container is composed of planar flexible material, and manufactured by a single folded sheet of flexible laminated heat sealable material, or by two separate sheets welded together, an optional closure or reclosable device can be fitted, and an optional label can be fitted in the inside of the container. The bottom of the container can be flat, or have a folded base to allow the container to stand up.

[0037] The invention includes an apparatus and method for the shaping, filling and sealing of containers of flexible and soft laminar material. The apparatus which comprises an unwinding station (figs.1, 2, 3, 4), a container pre-shaping station (1) with the optional inclusion of a reclosable device (for example of the kind known as zip®) (2) with the optional inclusion of a label placed at the inside of the container (3); a container filling station (4); a container sealing station (5) with an optional vacuum air extraction from the inside of the container (6). In said apparatus, the packaging material can be presented winded flat (7), as shown in figure 1 or pre-folded (8) as shown in figure 2.

[0038] In the pre-shaping station, a reclosable device (2) is welded to one wall of the container by a welding bar (9) (front or rear), and a label (3) is unwinded between the two walls of the container material.

[0039] Optionally, this label can be welded to one wall of the container material (front or rear) by a welding bar (10). The sides of the label are welded together to the container material by the transverse seal bars (11) forming simultaneously the two sides of the bag (27, 28), as shown in figure 8. The bags are transversely separated by a blade mounted in the same transverse seal bar (11), or by a following cutting mechanism (12), thus moving transverse separate cut (29), as shown in figure 9.

[0040] As can be seen in figure 1 and figure 19 (A;B; C) the filling station comprises a device (13) to open the bags, grabbed between the transport belts (14) and roller fingers or sliding pads (15), fill them with the product to pack which can be solid, liquid or granular, and close it.

[0041] As can be seen in figure 1 and figure 19 the horizontal seal station removes the air from the inside of the container trough the suction on ducts (6), makes one horizontal seal on top of the container (16, 32), the reclosable device (2) is welded to the free side of the container by the seal bar (17), and if there is a label, a second seal is made separating the label from the packed product

(18, 31).

[0042] Alternatively, the reclosable device and the label can be applied prior to film folding.

Brief description of the drawings

[0043]

- Figures 1 to 4 are views of the apparatus designed to implement the method according to the invention.
- Fig.5, fig.5A and fig.5B represent packaging apparatus and their parts according to the prior art.
- Figures 6 to 12 - are perspective views of a portion of flat container material, showing two container sections, dug different steps of implementing the method according to the invention illustrating several embodiments of the invention.
- Figures 13 to 15 are perspective and section views of finished containers, filled and closed according to the invention.
- Figures 16 to 18 represent a mechanical device for opening the container transported by transporting belts.
- Fig. 19 detail of the apparatus according to the invention showing the horizontal seal station removing the air from the inside of the container trough the suction on ducts (6).

Fig.19(A;B;C) details of the filling station comprising a device to open the bags, grabbed between the transport belts (14) and roller fingers or sliding pads (15).

Detailed description of the drawings

- [0044] According to figure 1 said apparatus comprises idle or motor-driven rollers (36) to unwind said container material (7) (film or sheet). Usually, the two faces of the packaging material used to manufacture containers similar to these of the invention have different properties; the inner surface will be in contact with the product to be contained, and the outer surface acts as printing medium to carry products information and advertising. As a consequence, it is usually difficult to weld the outer surface. As a result, the "W" shaped bottom is not welded in the outer surface resulting in an anaesthetic look, and poor container self-standing properties. To overcome this problem, prior to first folding (Fig. 6), a set of aligned perforations is made, by a perforating device formed by two pairs of transversally aligned perforations (35). Therefore, when folding, the inner surfaces of faces (22) and (23) will be in direct contact, trough holes (35) allowing a perfect weld where the perforations are present, keeping the two sides of the bottom "W" welded together, This is the achieved by the perforation device (37) at the area assigned for the base of the container to allow the welding of the inner side of the folded base, in cases where the external surface of the container material cannot be sealed by heat, and a folding device (1) to form a

"W" shaped container base.

[0045] This folding device can be aligned with respect to the middle section of the container material, allowing the formation of equal sides of the container, or shifted to one side to allow the production of two unequal faces, the container being handled by only one lip (edge).

[0046] Following this folding device, a compressing device helps flatten the folded container material (37).

[0047] A flat continuous label (3) is applied between the two walls of the container material (22, 23) and one or two longitudinal seals (10) can be applied to weld the label to one of the walls of the container.

[0048] This prevents the label from being displaced when the product to be packaged penetrates the container. Optionally, a zipper (2) can also be unwinded between the two walls of the container, being welded to one wall of the container (22) by a longitudinal seal (9).

[0049] It is provided a transverse welding station with the purpose of forming at least one set of side weldings (27, 28) and a cutting device can be integrated on the transverse welding station (11) or immediately after (12) cutting the transverse weld in the middle area with cut (29), individualising the containers.

[0050] A container opening device (4, 13), being prepared to open at least one container, adapted to open the transport belts (14), (figs 1,2,3,4) and the container opens the two lips (47) grabbed between the transport belts (14) and the opening mechanism (13, 15), of at least one container allowing the insertion of the product to be packed.

[0051] This said opening device allows the progression of the containers without damaging the transverse seals as it allows the two container lips (edges) to be close together during container transport along the machine (Figs. 18, 19(A;B;C) - detail B). The longitudinal seal bars 16 and 18 seal the container cavity (30) and of the top of the container, the reclosable device is welded (17) to the side opposite to the previous weld (9), the final separation of the containers is made by cutting device (46) which separates the last transverse section of the container material. Alternatively, a continuous strip is cut above the longitudinal seal by the cutting device (45).

[0052] Figures 5, 5A, 5B concern to prior art: machines: usually the container material is presented pre-folded on a reel (Fig. 5A) although some machines are fitted with a folding device, like HFFS (Fig. 5B). Transverse seal bars (100) weld the sides of the container, and separate then up to a certain height (101), and not straight to the top, like standard HFFS. The unsealed height (102) between the top of the container material and the top of the transverse seals is necessary to allow the material to go around a fixed fill opening (103), and the excess of material is cut after the product to be packed is inserted in the container and the container sealed (104). This excess of material is wasted (105), constituting one major disadvantage of this type of machines, which can waste as much as 20% of the packaging material with evident costs.

[0053] Figures 6 to 12 illustrate the container, which is object of the invention made of a flat material (film or sheet), at different steps of the method of invention.

[0054] In the step represented on figure 6 the container material has been folded with a triple fold forming the base of the container, foldings (19), (20) and (21) are parallel to each other shaping the container material in a "W" shape, defining front (22) and back (23) walls of the container and two bottom faces (24) and (25).

[0055] The step illustrated in figure 7 represents the folded container material with the label material (3) (paper or plastic) inserted between the two walls (22) and (23), and the optional reclosable device (2) placed below the label.

[0056] The step illustrated in figure 8 represents the container with side transverse seals (27) and (28) and again the label (26) which was welded at the transverse seals, and the reclosable device (2) which was melted and welded together with seals (27) and (28)

[0057] The step illustrated in figure 9 represents the container with transverse seals (27) and (28) where a separation transverse cut (29) has been made (symbolic representation by scissors) for separating adjacent containers.

[0058] The step illustrated in figure 10 represents the container with the product to be packed inserted into the container cavity (30) with the longitudinal seals (31) and (32) behind the reclosable device (2) a longitudinal seal is made to secure it on container wall (23). It was previously welded to wall (22).

[0059] The step illustrated in figure 11 represents the container with all the seals (27, 28) and (31, 32) and where it is depicted the final longitudinal cut (symbolic representation by scissors) to trim the top (33) of the container above the top longitudinal seal (32).

[0060] Alternatively to the step illustrated as figure 11, figure 12 represents the container with all the seals (27, 28, 31, 32) and the final transverse cuts (34) at the sides of the container made to separate the containers..

[0061] Figure 13 represents a perspective view of the closed labelled container and two cross-sectional views (A-A and B-B). In this case it's a stand-up bag. Preferably seals are made by hot welding. Perforation (35) was not applied, either because the outer surface of the film allows welding, or simply was decided to leave the two folds unwelded against each other.

[0062] Figure 14 represents another embodiment of the closed labelled container with reclosable device and two cross-sectional views (A-A and B-B), in this case it is a stand-up bag with perforations (35) applied to allow the welding of the outer surface of the folded bottom.

[0063] Fig. 15 represents another embodiment of the closed labelled container and two cross sectional views (A-A and B-B). In this case it is not a stand-up bag since the bottom of it ends up with a sharp folded edge.

[0064] Fig. 15B represents another embodiment of the closed labelled container and two cross sectional views (A-A and B-B). In this case it is not a stand-up bag since

the bottom of it ends up with a sharp welded edge.

[0065] Figures 1, 2, 3, and 4 represent a machine for packaging products in flexible containers (e.g. bags), with the container material starting from a flat heat-sealable reel (figs. 1, 3), or optionally from a "V" prefolded reel (figs. 2, 4), and for the subsequent steps of labelling and/or fitting reclosable devices (e.g. zippers) filling with the product to be packed and closing according to the method described above with reference to figures 16, 17, 18 and 19 where the apparatus is represented schematically.

[0066] One should note that, although a method and an apparatus have been disclosed above for the process of packaging products in flexible containers on fig. 13, fig. 14 and fig. 15, starting from flat heat-sealable sheet (7), it is obvious that said container can also be manufactured departing from a previously "V" folded reel (8), although this method involves an extra cost on material purchase. Specifically the only difference lies in the previous folding and winding of the container material. From the compressing device (37) to the end of the production process, the production steps are exactly the same, resulting on final container shaped as depicted in figure 15.

[0067] Also, it is possible to manufacture the containers described, departing from two separate flat reels of container material (film or sheet), joined at the bottom by a longitudinal seal (as depicted by fig 10.B). This last method however does not exhibit the costs and handling advantages inherent to the production process using one single reel of container flexible material.

[0068] More specifically, two separate sheets of container material can be joined by welding on folding lines (19), (20), or (21), and the method and packaging process could be performed in the manner described above.

[0069] One of the most important issues of the invention is the possibility to open and close the container the feeding opening, this preventing the waste of important amounts of packaging materials. The possibility to adapt an opening device to the various widths of bag being the most difficult achievement, herewith described step by step.

[0070] Referring to Fig. 16 (and fig. 19(A; B; C) schematically) it represents the said mechanism (Detail B) in closed position. The edges (Lips) of the bag (47) are close together, so there is no risk of tearing the transverse seal (27, 28) when the bags are transported by the transport belts (14).

[0071] When operating smaller bags, the mechanism opens partially, the length of the aperture not exceeding the length of the bag previously made (Fig. 17, Fig. 19 (A; B; C) - detail C).

[0072] As the transverse seals (27, 28) are kept outside the limits of the feeding opening, there is no risk of tear during the opening and closing of the bag.

When operating wider containers, the mechanism can be fully opened, (Fig. 18, fig. (A;B;C) - detail A) and, as the transverse seals, (27, 28) are still kept outside the limits of the mechanism, there is no tear. After filling the

product to be contained (steps shown in Fig. 17 or Fig. 18), the mechanism resumes to the closed position shown on fig. 16, and fig. 19(A;B;C) -detail A and with the mechanism fully closed the transport belts, move the filled container to the horizontal seal station, and in the same movement at least one new empty container is placed in the opening mechanism.

Description of preferred embodiments

[0073] The apparatus illustrated on Figures 1, 2, 3 and 4 represents a mechanically driven machine with respectively a flat reel of film (7, figures 1, 3) and a prefolded film reel (8) figs. 2 and 4.

[0074] The motor (40) drives the transport belts (14) and motor (41), drives a cam tree where all the devices are connected. This guarantees that the action of the label weld, (10), zipper weld (9), transverse seals (11), transverse cut (11) or (12), filling opening (13), buffer doors (39), longitudinal seal weld (upper (16) and lower (18)) zipper weld (42) and the final separation blades (37) are operated simultaneously. When all mechanism retracts to the idle position, the drive belts (14) move the container one cycle forward and the containers are formed step-by-step until they reach the final position.

[0075] The transport conveyor (44) sitting under the containers supports their base preventing them from tearing with product impact, and hold the containers after the final separation. Transport conveyor is synchronized with the drive belts (14) and moves at the same linear speed.

[0076] The action of the belt opening device (13), the key issue of this invention must be seen with deeper detail 16, 17, 18 and 19. On figures the mechanism is represented schematically in three different positions.

[0077] Fig. 16, 19(A;B;C)-detail B represents the mechanism fully closed, both transport belts compress each edge (lip) of the bag against two sets of rollers, one for each belt, allowing the film to be dragged without damaging the transverse seal.

[0078] Fig. 17, 19(A; B; C) - detail C represents the mechanism partially open, to fill a bag of smaller length. The opening devices 13 try to pull the belts out, grabbing the film between the rollers and the belt. The two plates 43 have been moved to a partially open position, allowing only the inner rollers to move out, and blocking the movement of the outer rollers. In the example shown, the mechanism is opening a bag with approximately half of the width of the fully opened mechanism.

[0079] On figure 18, 19(A; B; C) -detail A, the blocking mechanism 43 has been moved to the maximum extension, allowing the expansion of all the rollers, thus allowing the device to open fully. This allows the filling of a bag not shorter than the full length of the mechanism. By stopping the device 43 on different positions one can fill bags of different sizes.

[0080] In cases where the machine will work only with bags with little different in size, the device 43 can be suppressed, and the opening mechanism will have a

fixed aperture size. This simpler device is represented without plates 43 on figures 1 to 4.

[0081] The complete mechanism is described separately in figs. 16 to 19 for a matter of clearness.

Claims

1. Method for the production of flexible containers starting from a flat flexible sheet, and the subsequent packaging of material by filling and closure of the said container, comprising the following stages:

- Folding the container sheet in three folding lines (19) (20) and (21), parallel to each other, forming the front (22) and back (23) faces of at least one container and possibly a standing base (24, 25)
- Inserting between the front and back faces of at least one container a sheet like continuous label (3) in paper or plastic-type material.
- Joining by welding at least one edge of the said label to one face of at least one container (front (22) or rear (23))
- Joining by welding to the front side (22) of at least one container a reclosable device (2).
- Joining by welding the two sides of at least one container (27) and (28), and simultaneously, joining the label to the sides (38) of the containers, and the ends of the reclosable device (2).
- Cutting transversely at least one container along the middle of the transverse welds (29), separating the containers, which will remain grabbed by the lip (47) between the transport belts (14) and holding fingers (15)
- Filling at least one container by opening it by the two lips (47) and introducing the product to be contained in at the least one container.
- Closing the two lips of at least one container prior to moving at least one container to the next station.
- Preferentially vacuum exhaust of the air contained on at least one container through the vacuum duct and probe (6) when required.
- Sealing at least one container with two longitudinal seals, one below the label (31, 18) to separate this from the contained product and one above the label (32, 16) to completely seal the container.
- Sealing the back of the reclosable device (2) to the rear wall (23) by the welding device (42).
- Completely separate at least one container by cutting transversely the remaining container material (34, 37).

2. Method, according the claim 1 **characterized in that** the "W" base folding (19, 20, 21) is replaced by one single folding (19) producing a pillow shaped

container instead of a stand up container.

3. Method according to claim 1 **characterized in that** a reclosable device is not applied below the label, not forming a reclosable container (2).

4. Method according to claim 1 **characterized in that** a reclosable device is applied below the top longitudinal seal (16, 32), without the insertion of the label, and without the bottom longitudinal seal (31, 18).

5. Method according to claim 1 **characterized in that** a reclosable device is applied below the top longitudinal seal (32, 16), without the insertion of the label, and where the "W" base folding is replaced by a simple "V" folding, and without the bottom longitudinal seal (18).

6. Method according to claim 1, **characterized in that** only a simple "V" folding is made instead of the "W" folding at the base, no label is applied, no reclosable device is applied, and bottom longitudinal seal (18) is not applied.

7. Flexible container produced according to the method described in claims 1 to 6 **characterized by** being a container with sharp fold on the base.

8. Flexible container produced according to the method described in claims 1 to 6 where no vacuum is created inside the container cavity (30).

9. Flexible container (produced according to the method described in claims 1 to 6 **characterized by** being a stand-up container.

10. Flexible container of stand-up type ("W" fold base) produced according to the claims 1 to 6 **characterized by** no vacuum is created inside the container cavity (30).

11. Flexible container of the type with sharp base ("V" fold base) produced according to the claims 1 to 6 **characterized by** no vacuum is created inside the container cavity (30).

Flexible container produced according to the method of claims 1 to 6 where vacuum is created inside the container cavity (30).

12. Apparatus for producing flexible containers starting from a flat flexible sheet and for the subsequent packaging of material by filling and closure thereof, **characterized in that** it comprises, in the direction of forward movement of the container sheet material:

- Motor-driven or idle rollers (36) for the unwinding of the container sheet.

- A folding device to form the "W" (1) shaped triple fold, or, alternatively, a "V" fold.
- A compressing device to flatten the folded sheet (37).
- Motor- driven or idle rollers (38) to unwind the label between the folded container sheet.
- At least one welding station (11) in charge of making the two transverse welding strips in adjoining containers in each forward movement of the sheet.
- At least one cutting station to cut the sheet through the middle area of at least one transversely welding strip, individualising the containers and the label welded inside the container (11, 12).
- A container opening station (4), adapted as to separate in a direction perpendicular to the movement of the sheets, the two lips (edges), of the container mouth of at least one container, and to close the container mouth prior to sheet movement.
- At least one container filling station, working simultaneously with the container opening station.
- Preferentially at least one vacuum device (6) to extraction from at least one container cavity.
- At least are welding station sealing the container with two longitudinal welds, one below and one above the label (16, 18).

14. Apparatus according to claim 9 **characterized in that**, upstream of the folding system, it comprises perforation devices (26) for the sheet portions making up the base of the container.

15. Apparatus according to claim 9 **Characterized in that** the label is replaced by the placement of a reclosable device resealable device, with the application of only one longitudinal seal (16) above the reclosable device.

16. Apparatus, according to claim 9 to 11 **characterized in that** the sheet container material is presented winded with "V" like fold, allowing the production of a pillow -like container.

17. Apparatus according to claim 13 characterized by the motor (40) which drives the transport belts (14) and motor (41), drives a cam tree where all the devices are connected which guarantees that the action of the label weld, (10), zipper weld (9), transverse seals (11), transverse cut (11) or (12), filling opening (13), buffer doors (39), longitudinal seal weld (upper (16) and lower (18)) zipper weld (42) and the final separation blades (37) are operated simultaneously, and when all mechanism retracts to the idle position, the drive belts (14) move the container one cycle forward and the containers are formed step-by-step

until they reach the final position.

18. Apparatus according to claims 13 to 17 **characterized by** the transport conveyor (44) sitting under the containers supports their base preventing them from tearing with product impact, and hold the containers after the final separation and the transport conveyor is synchronized with the drive belts (14) and moves at the same linear speed.

19. Apparatus according to claim 13 **characterized by** the action of the belt opening device (13), where the mechanism can be fully closed, where both transport belts compress each edge (lip) of the bag against two sets of rollers, one for each belt, allowing the film to be dragged without damaging the transverse seal or, the mechanism can be partially open, to fill a bag of smaller length or, the blocking mechanism 43 can be moved to the maximum extension, allowing the expansion of all the rollers, thus allowing the device to open fully, and in this manner, one can fill bags of different sizes.

20. Apparatus according to claim 19 **characterized by** the opening device 13 being capable of pulling the belts out, grabbing the film between the rollers, and the belt and the two plates 43 can be moved to a partially open position, allowing only the inner rollers to move out, and blocking the movement of the outer rollers.

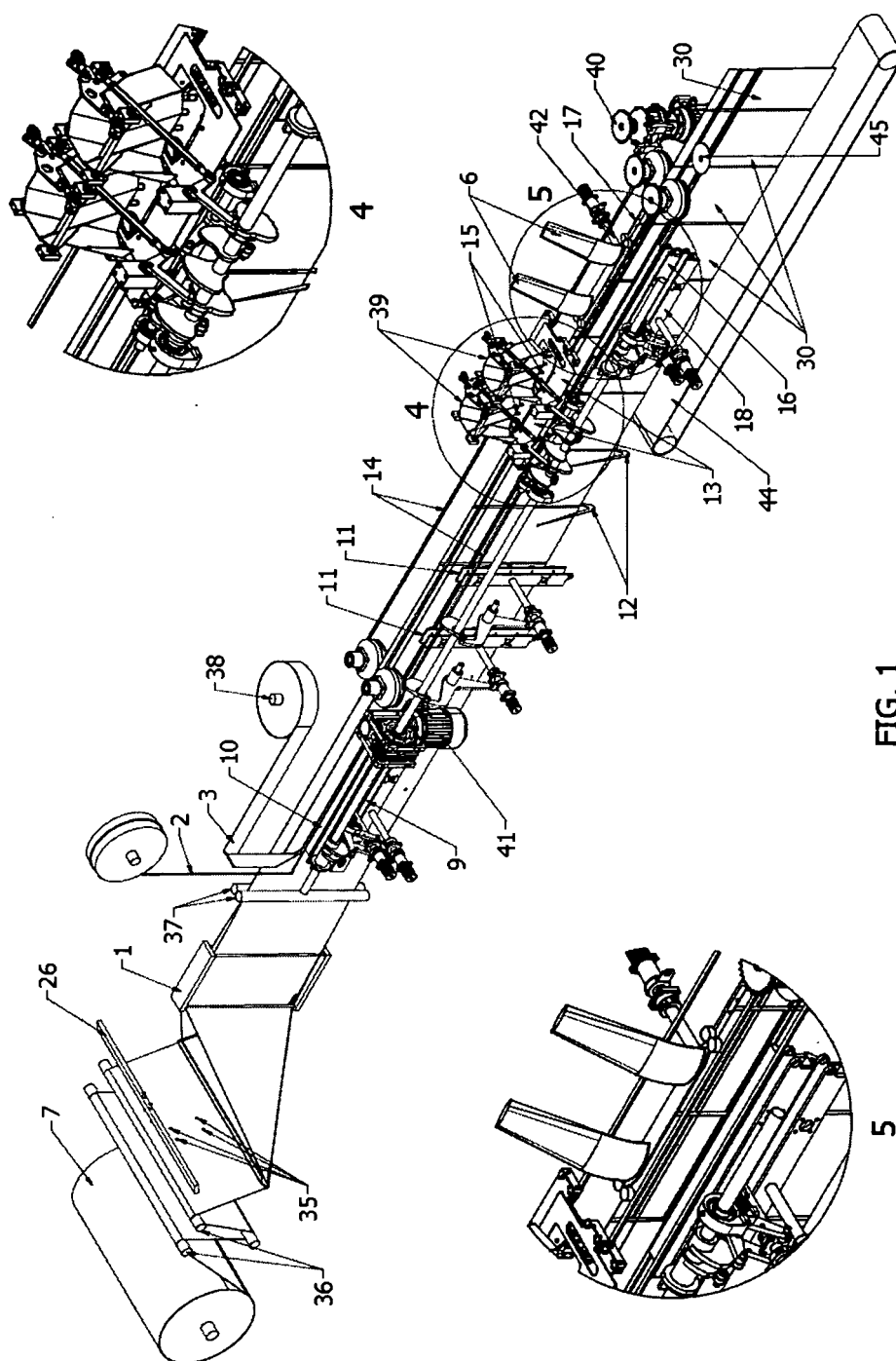


FIG. 1

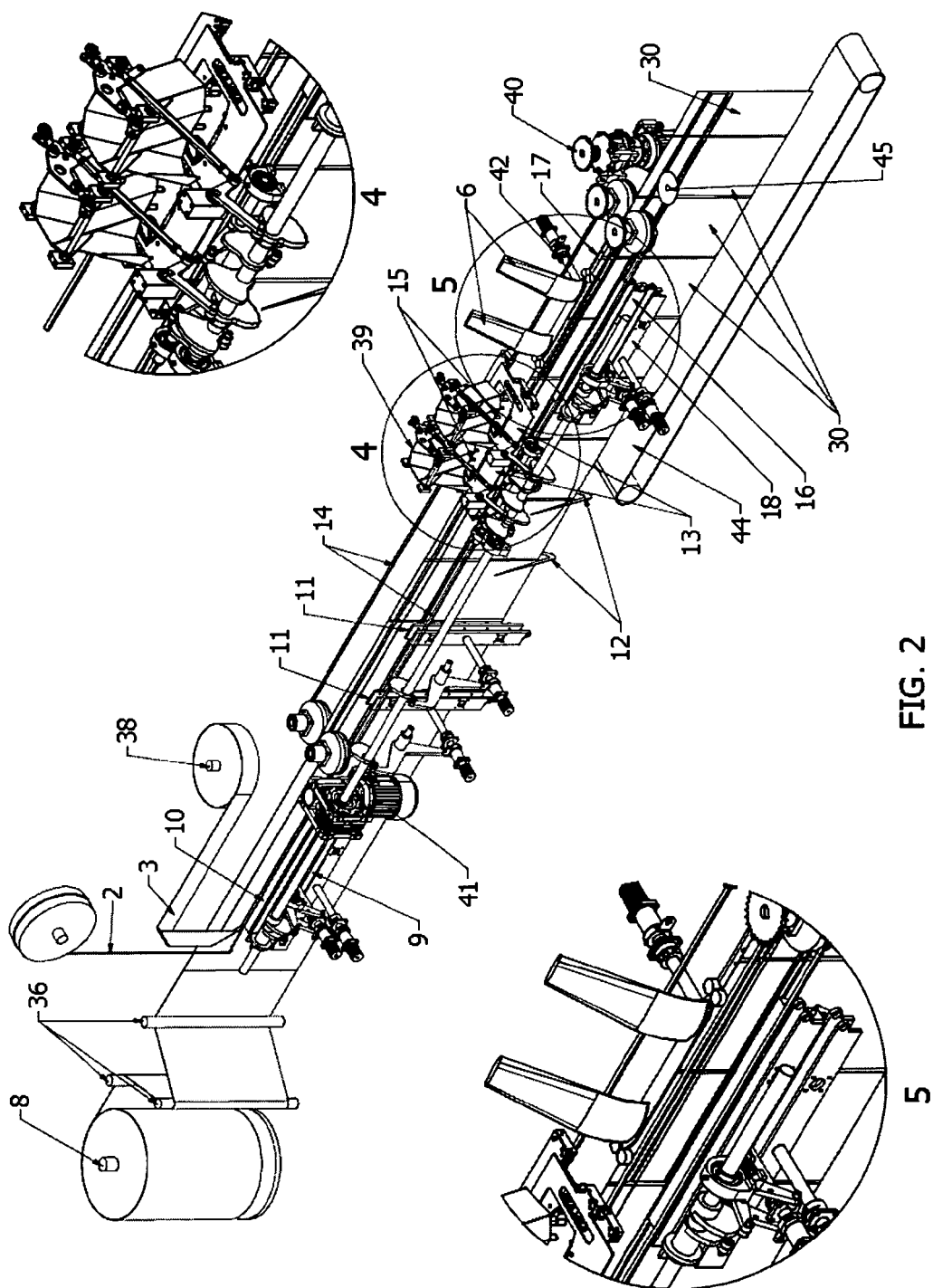


FIG. 2

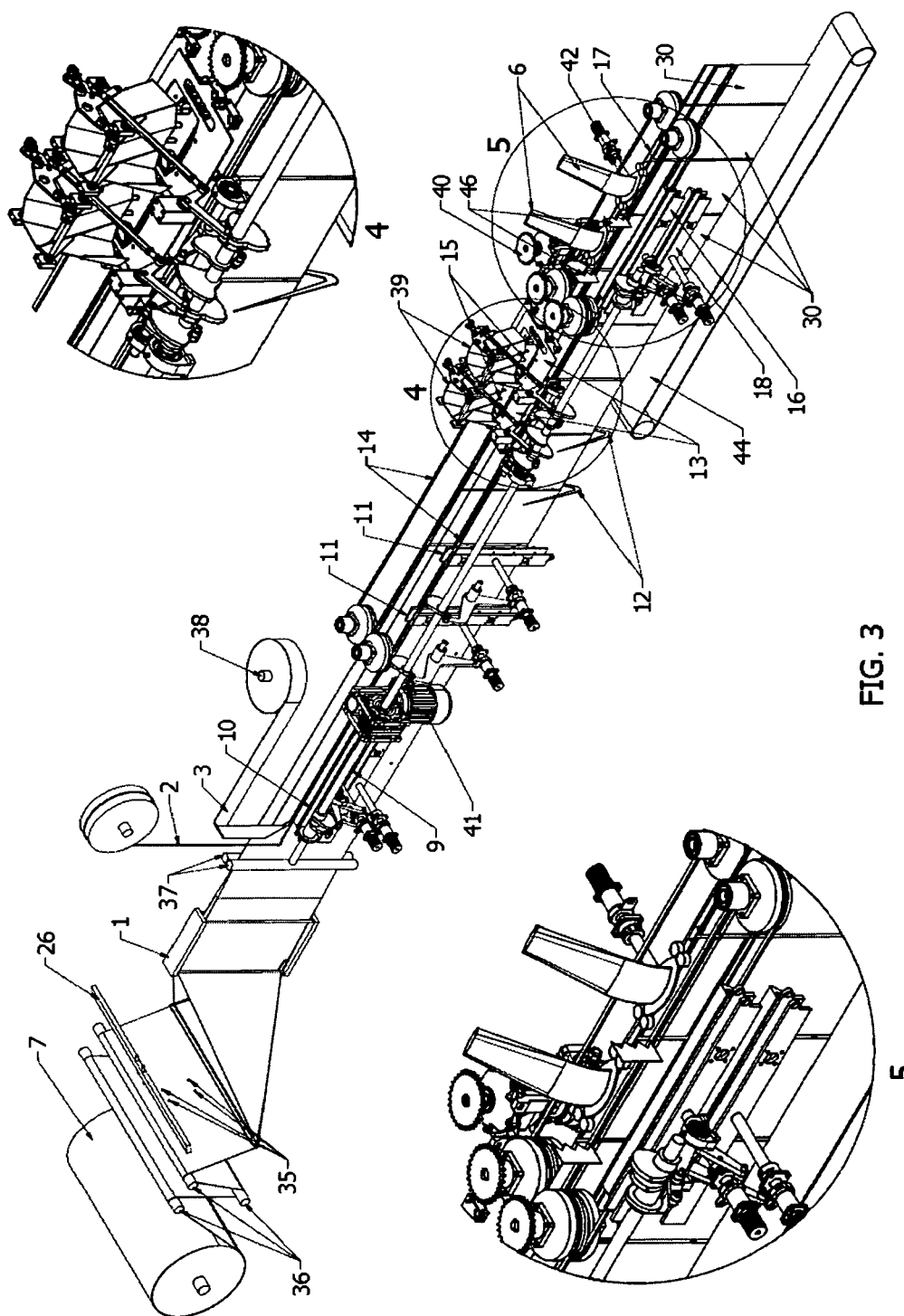


FIG. 3

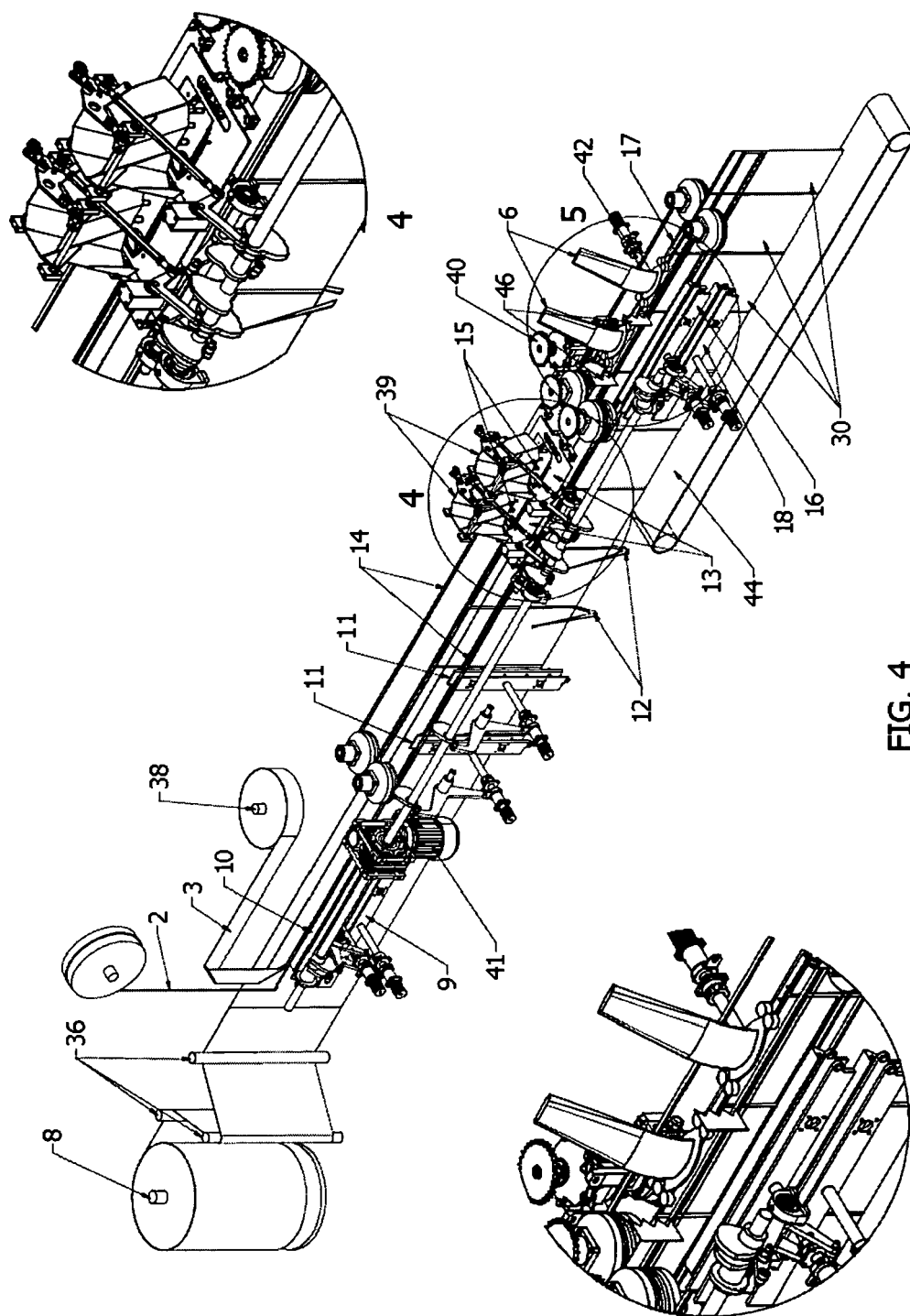


FIG. 4

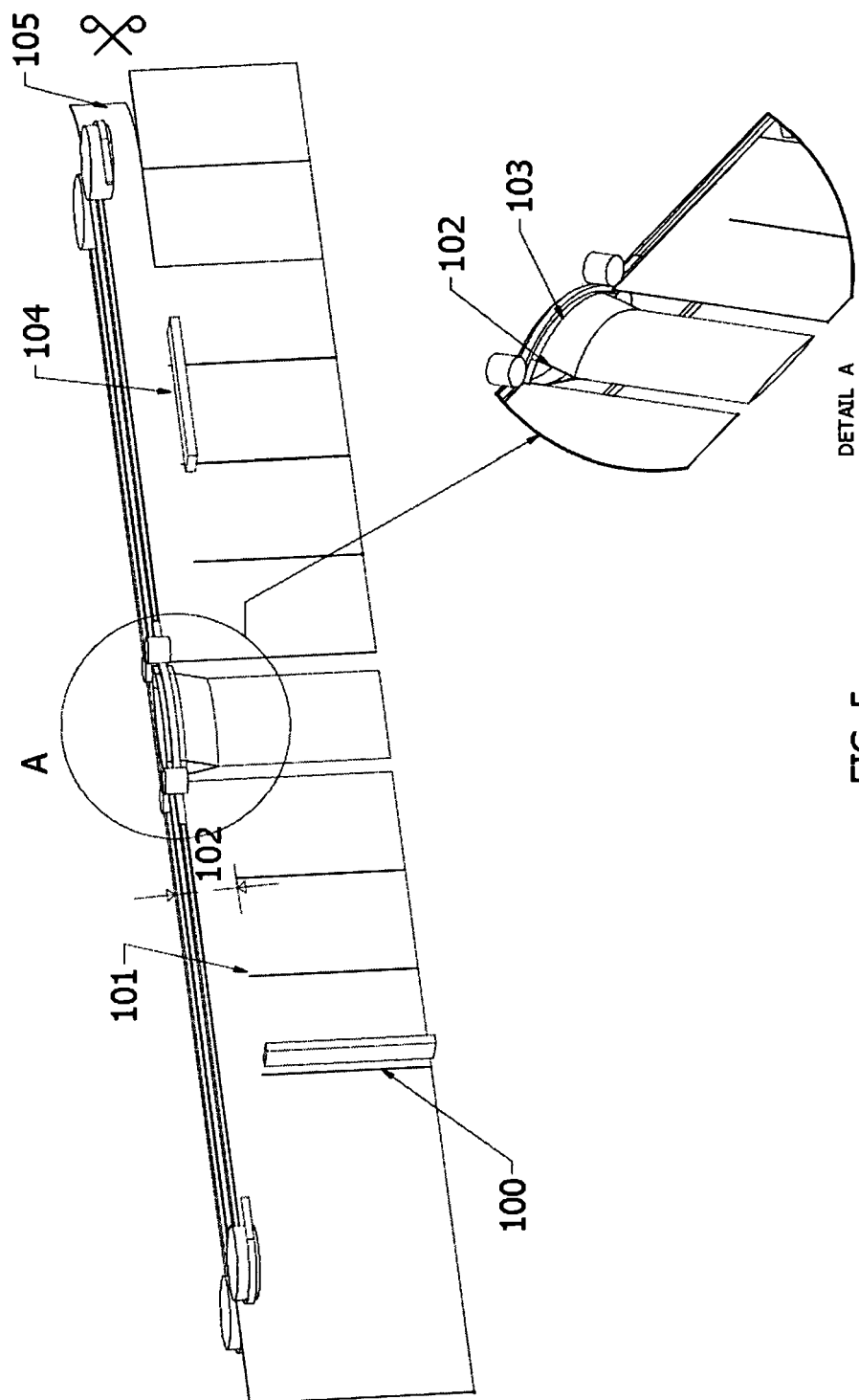


FIG. 5

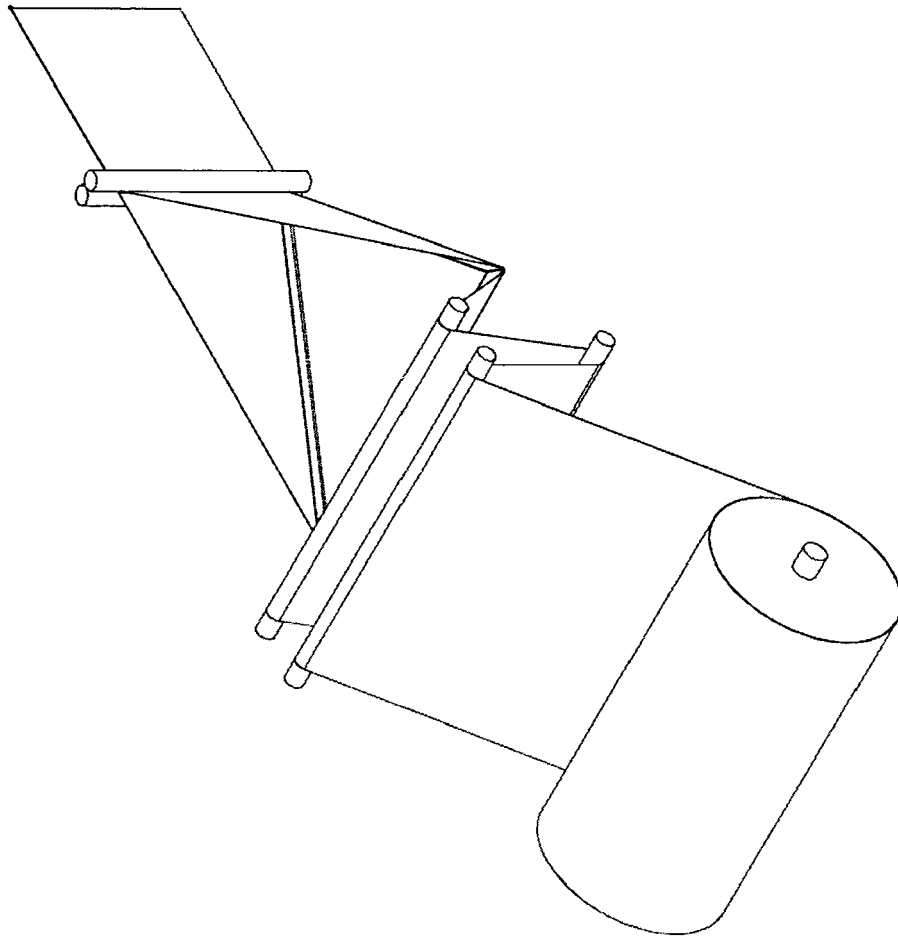


FIG. 5B

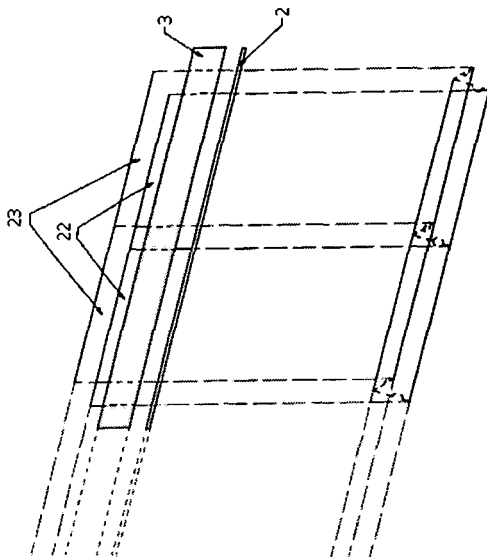


FIG. 7

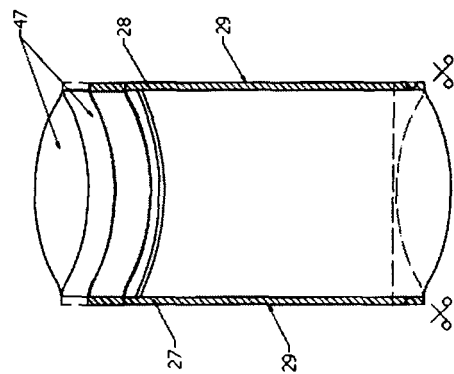


FIG. 9

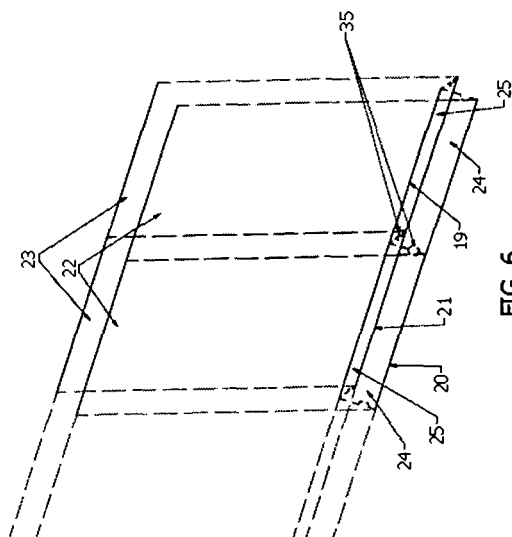


FIG. 6

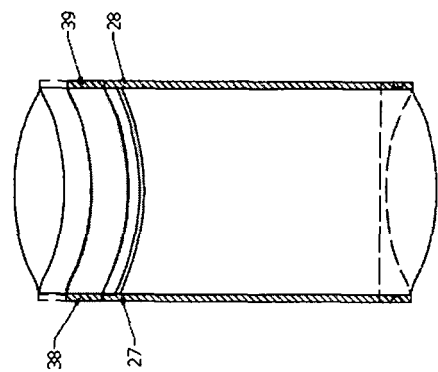


FIG. 8

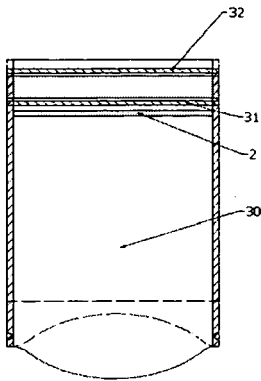


FIG. 10

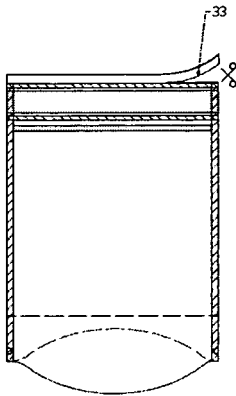


FIG. 11

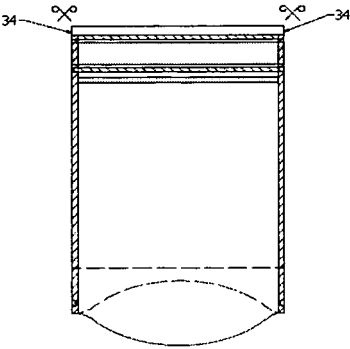


FIG. 12

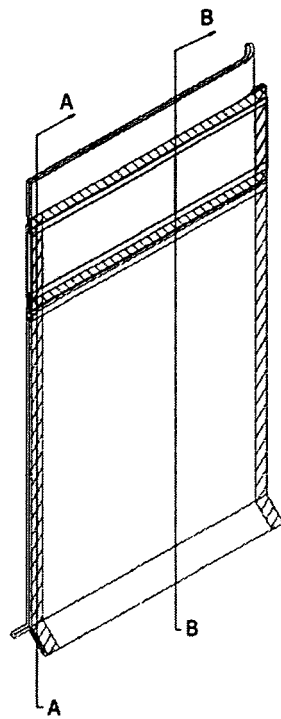


FIG. 13

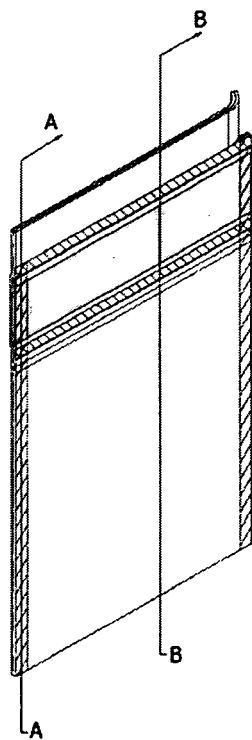
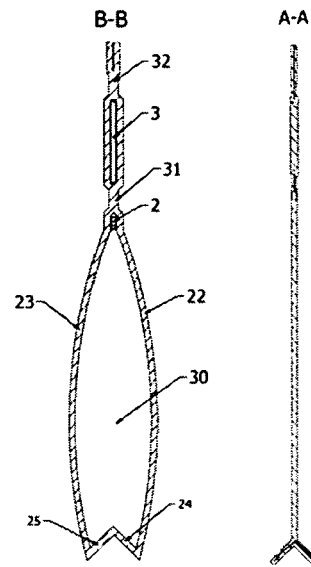
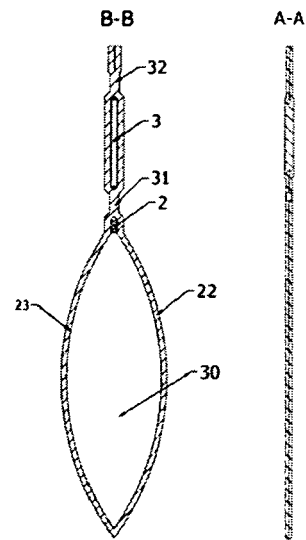


FIG. 15



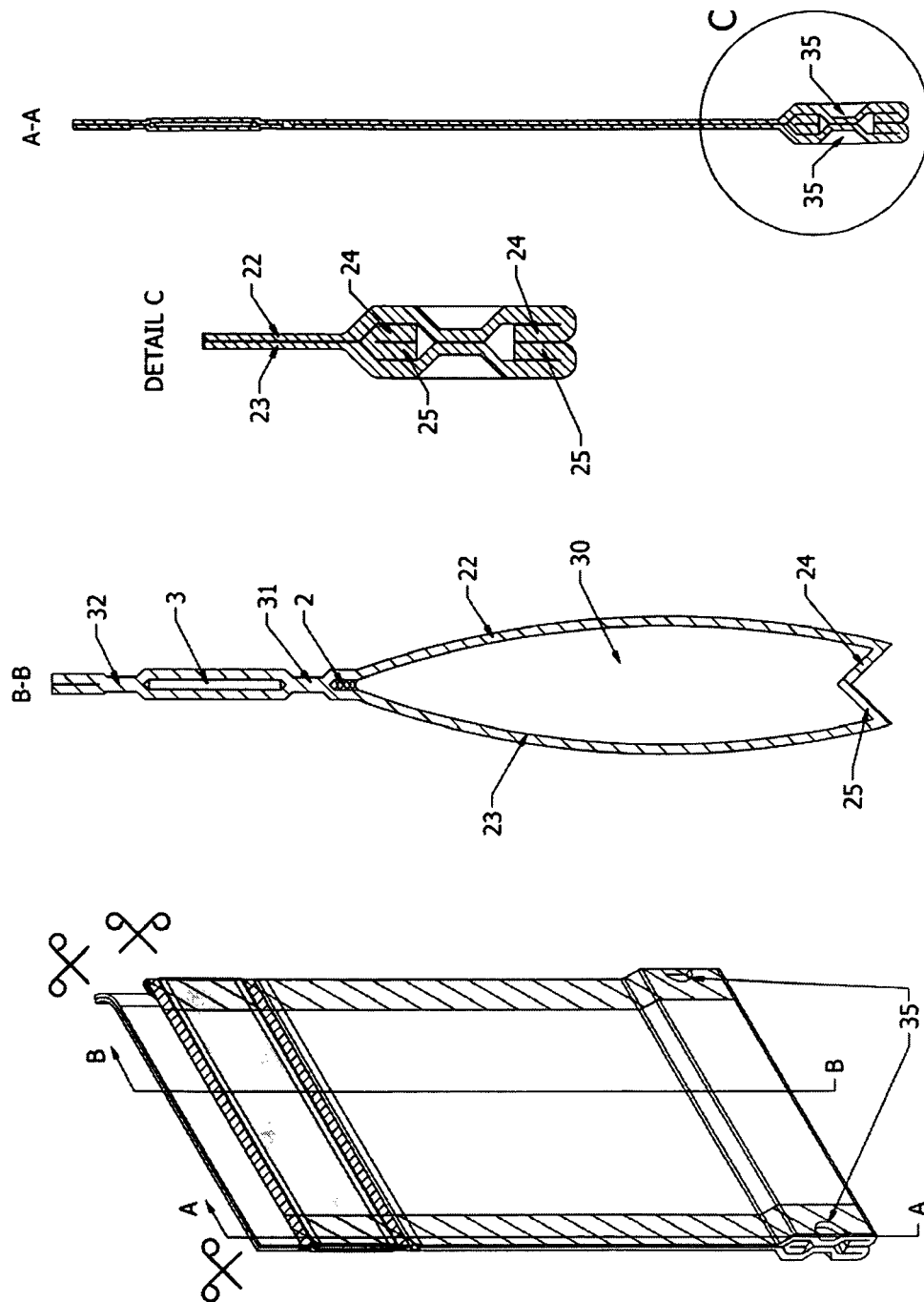


FIG. 14

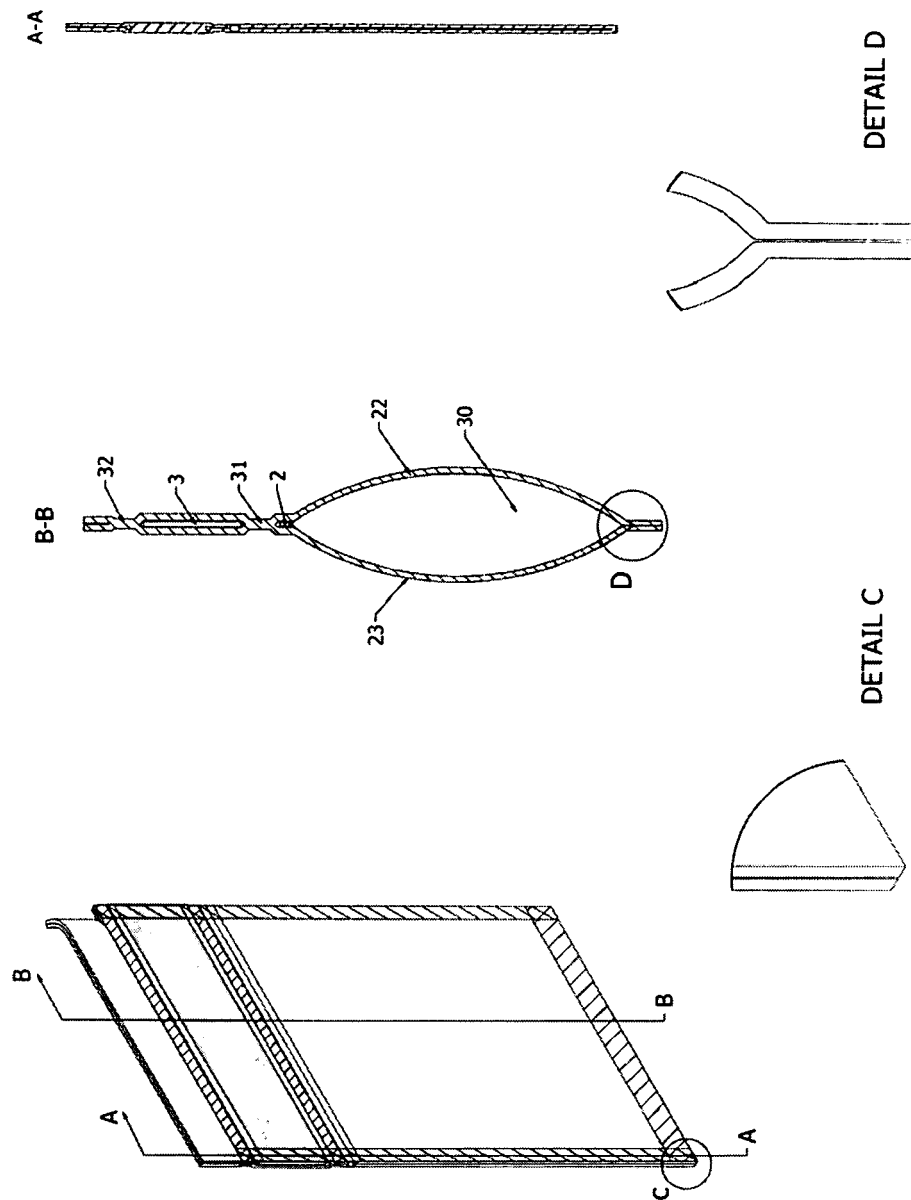
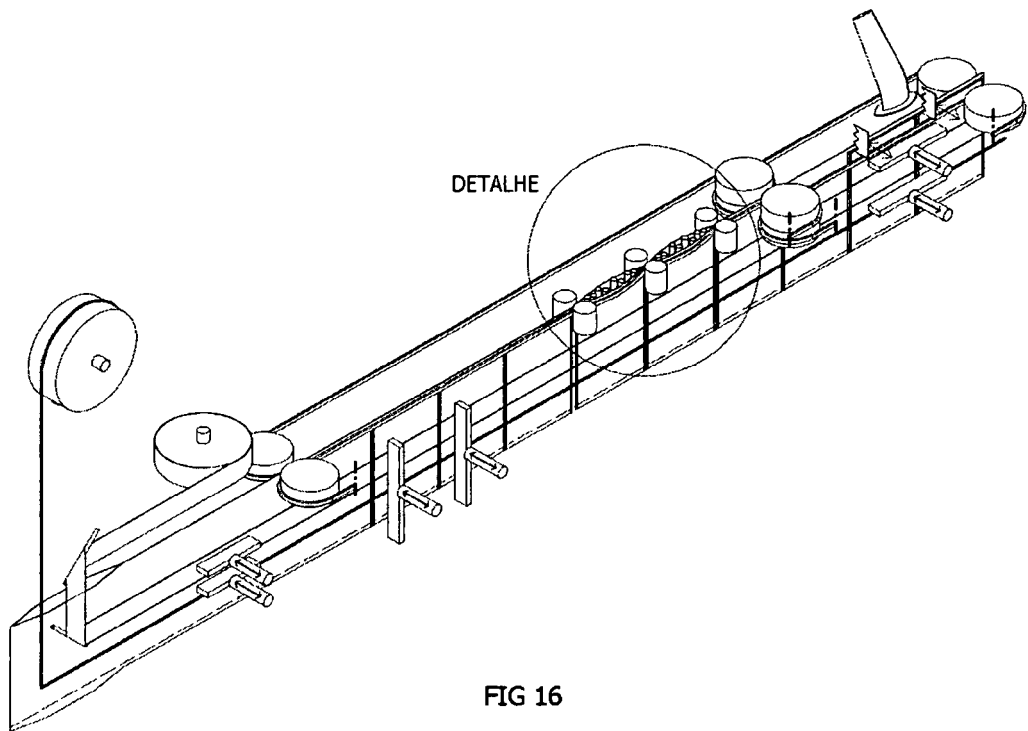


FIG. 15B



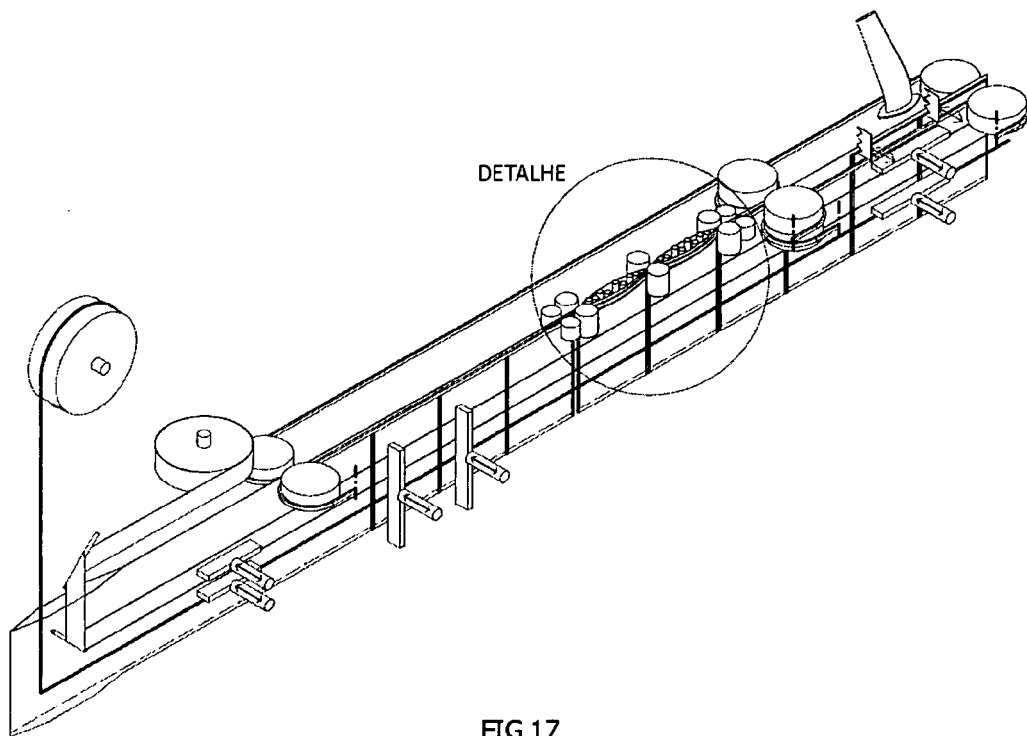


FIG 17

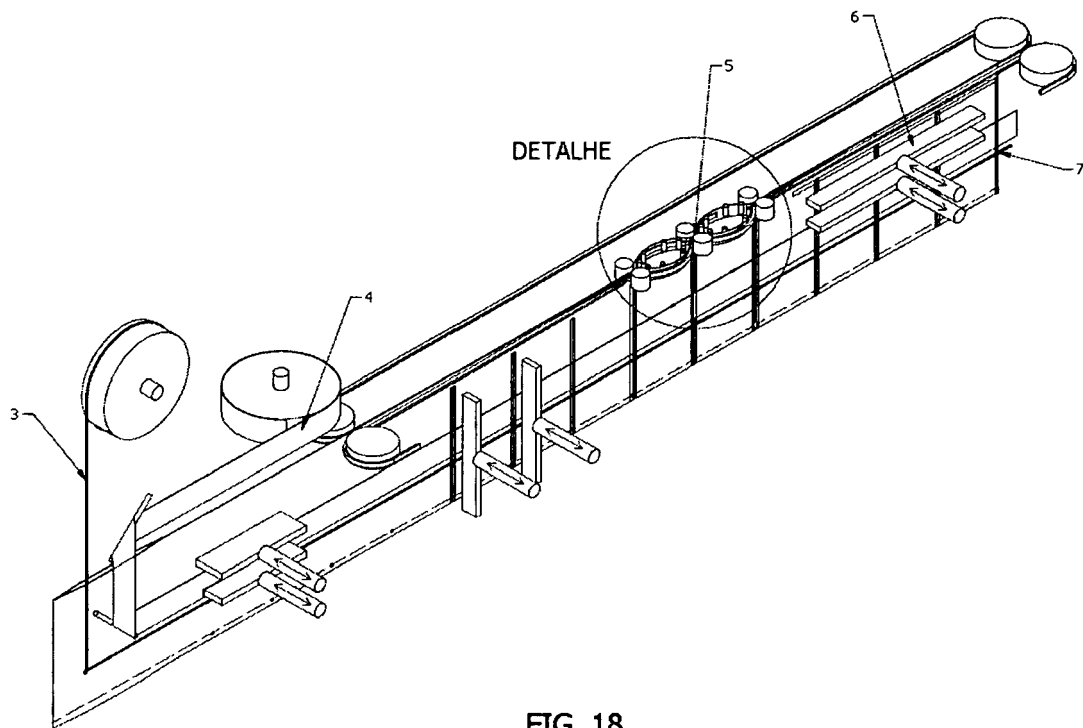


FIG. 18

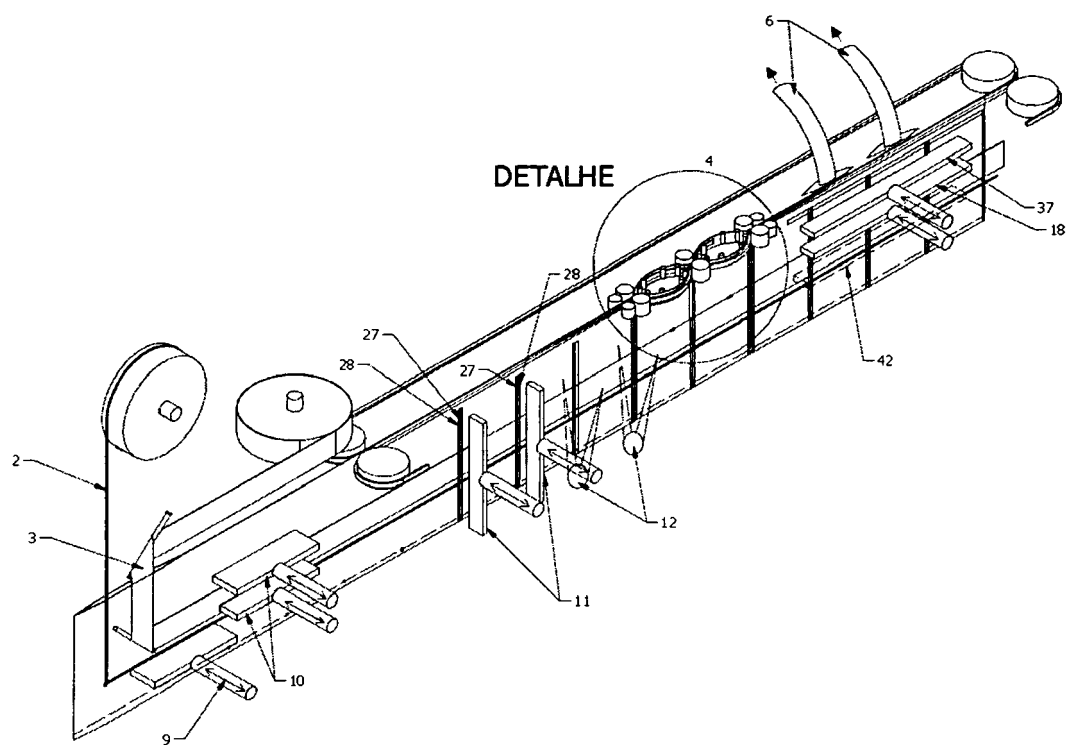


FIG. 19

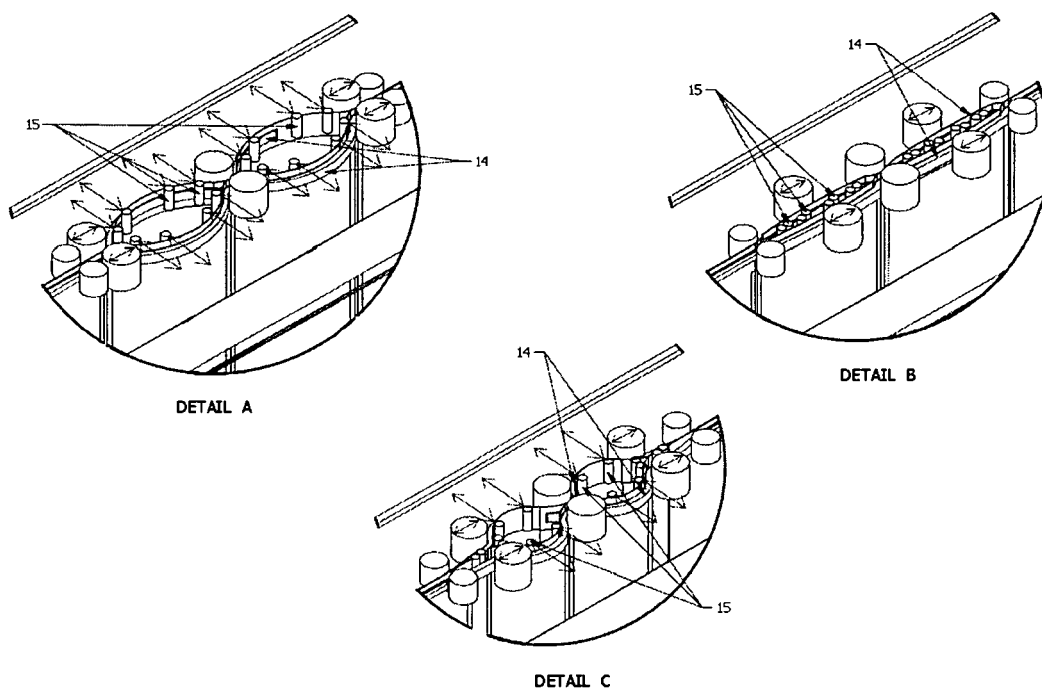


FIG. 19 (A; B; C)



EUROPEAN SEARCH REPORT

Application Number
EP 09 39 8011

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 0 169 464 A2 (ABG APPARATEBAU-GESELLSCHAFT) 29 January 1986 (1986-01-29) * page 6, line 1 - page 11, line 27; figures * -----	1-3,7, 11-13,16	INV. B65B9/08 B31B19/90 B65D33/25 B65D75/00 B65B61/18
A	EP 1 211 061 A2 (ILLINOIS TOOL WORKS) 5 June 2002 (2002-06-05) * column 2, line 20 - column 3, line 53; figures * -----	1,7,9, 12,15	
A	EP 1 614 634 A2 (REYNOLDS CONSUMER PRODUCTS) 11 January 2006 (2006-01-11) * claims; figures * -----	1,4,7, 12,15	
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			TECHNICAL FIELDS SEARCHED (IPC)
			B65B B31B B65D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 19 May 2010	Examiner Jagusiak, Antony
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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EP 09 39 8011

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19-05-2010

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