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(54) METHOD FOR FORMING THE LOWER SURFACE OF A CONTAINER WITHOUT THE APPLICATION OF HEAT IN A VACUUM PACKAGING PROCESS

(57) Procedure to shape the slightly concave lower surface of a package using two thin plastic laminates from two different reels removing the application of temperature and stretching the lower laminate and including the stretching processes on the width of the lower laminate by any known method, such as folding or creasing, then positioning the said stretched laminate onto a chain pulling system being held onto such chains by retaining methods and transversally by two rods and finally shaping the lower surface of the packaging to place the product onto the stretched laminate with the assistance of blowing/sucking and/or pressure.

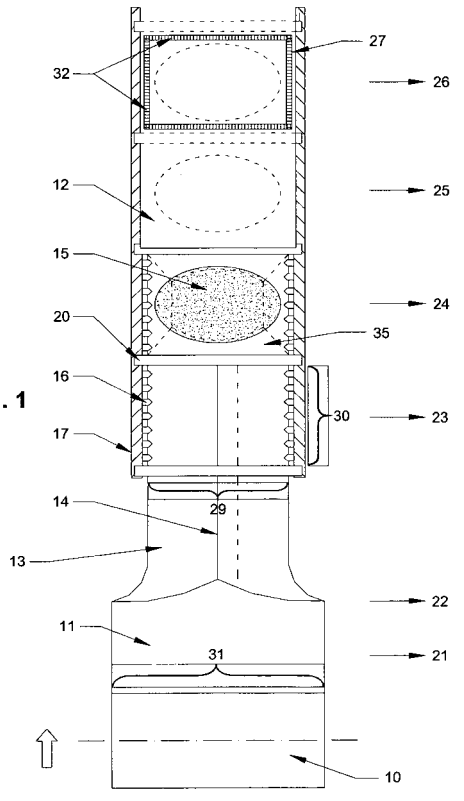

Fig. 1

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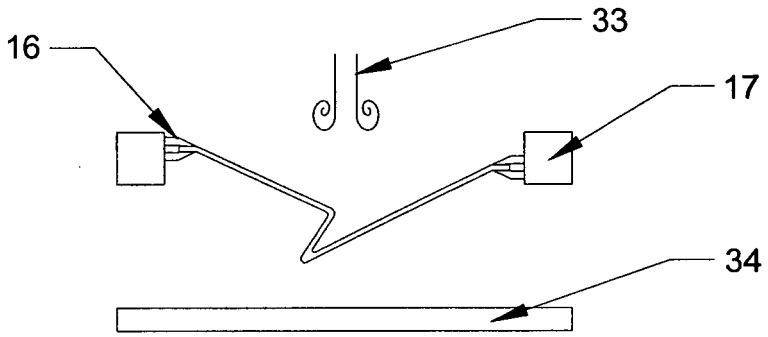
Fig. 4



Description

[0001] The procedure is used to match the shape of the lower surface of a package to the product without applying heat to a thin lower plastic laminate from a reel, forming part of an automated vacuum packing process with one or more products inside thin plastic wrappings, the main aim of which is to minimise packaging manufacturing costs in addition to removing one of the shaping processes.

[0002] This procedure has been especially designed for packages formed by flexible, shrinkable laminates and not by metal, aluminium or rigid laminates.

[0003] The conventional automated manufacturing process for vacuum packaging consists of several successive stages, the first of which shapes the lower surface of a package by heat inside a mould with a generally concave surface, followed by placing the product in the concave shape of this laminate, forming a vacuum inside both laminates and finally sealing the package by welding the entire border.

[0004] Generally speaking there are currently different procedures used to shape the lower surface of a package manufactured from two different laminates. These allow a thin plastic laminate from a reel to be attached to the inner surface of a slightly concave pattern. Out of all of the known procedures, the most widely used is thermoforming, which uses a heat source to heat up the lower plastic laminate to its softening point and then forming a vacuum between the mould and the laminate, located horizontally on the mould so that it is stretched, increasing its length due its semi-plastic properties thereby shaping it perfectly to the concave surface of the mould. Then the shaped surface has to cool to allow it to be removed from the mould.

[0005] Alternatively, pressure may be applied to the laminate instead of forming a vacuum and then both techniques may be combined to shape the lower surface of the package to the mould.

[0006] However, this technique has some drawbacks, mainly regarding the stretching of the laminate. Firstly, as the plastic laminate to be stretched at the entrance has to be thicker than the final laminate, considerable increasing the package's raw materials and secondly by stretching the laminate it becomes thinner in areas where this is not required and may cause faults reducing the final quality of the package.

[0007] To resolve the above drawbacks, different pre-stretching techniques have been developed, such as those using a plunger or prior blow forming to obtain improved evenness with the laminate's thickness before the thermoforming process. However there are still significant losses with raw materials and energy.

[0008] This invention in one of its developments seeks to resolve the aforementioned drawbacks due to the removal of the temperature application process and stretching or pre-stretching the lower laminate during the forming stage of the package's lower surface and increasing its quality.

[0009] In order to achieve these functions an advantageous process has been designed mainly consisting of shortening the width of the lower laminate compared to the initial width of the laminate rolled in a reel before placing this laminate in the pulling system, formed by two parallel chains separated by a certain distance with transverse rods, so that once the stretched laminate is attached to the aforementioned pulling system, longitudinally held to the chains by retaining methods and transversally held by two longitudinal rods, to position the product directly onto the laminate using its own weight, with the laminate unfolding and acquiring the concave shape required for packaging.

[0010] As an option, methods may be included to assist in shaping the lower surface of the package such as applying force by a piston or by blowing or sucking air.

[0011] Therefore the procedure in this invention includes processes for:

- Stretching the width of the lower laminate by any known method such as bending or folding.
- Positioning this stretched laminate in the pulling system, holding it to two chains by retaining means and transversally by two rods.
- Shaping the lower surface of the package by placing the product onto the stretched laminate and by using blowing/sucking and/or pressure methods.

[0012] Preferably methods used for cutting the width of the lower laminate before placing it inside a pulling system are by creating a series of bends or folds. However this may be from any other equivalent system allowing the aforementioned to be decreased without changing the essence of the invention.

[0013] The distance between the pulling system chains depends on the size of the width of the final package and shall be almost the same as the width of the final package.

[0014] Preferably, the means of holding the laminate to the chain pulling system should be by clamps and depending on the sizes of the package to be manufactured the number of clamps will vary.

[0015] In this way, the means of holding the product to the chains grip onto the two longitudinal bases of the lower stretched laminate and tightly held to the same to the pulling chain, while the two rods hold the aforementioned laminate by the two transverse bases separating the packages in series at the same time.

[0016] Two appropriate rods have been designed to transversally hold the lower, stretched laminate to the two chains with the gaps between the rods being the same size of the package to be manufactured, almost the same as the width of the final package. The location of the rods in the pulling system is fixed as each pulling system is designed exclusively for a given package; however, the possibility of dispensing with one of each of the rods has been included, so that the gap between the rods

is doubled and the packaging manufactured will have the same width and double the length in order for the same pulling system to shape two different sized packages.

[0017] Additionally, support methods on the lower section of the pulling chain have been designed such as rollers or a horizontal surface, to place the product onto the system and to shape the concave surface of the lower laminate so that it sits on top of the aforementioned support to prevent the laminate from being over-stretched.

[0018] The stated procedure may be used for manufacturing one single cavity per package as previously described or for manufacturing multiple cavities in a package, known as "packs". These are usually found in long run automated processes and use a single lower and upper laminate to manufacture different cavities at the same time and then to die cut them to obtain individual packages.

[0019] To carry out this form of packaging, the same procedure is used whereby the lower laminate's width is cut, held to the pulling system by its four bases and using the weight of the product to unfold the laminate, with a specific feature of having one or more intermediate separators laid out in a parallel manner to the chains with retaining methods on both sides so that the laminate is longitudinally held by more than two bases.

[0020] In particular, this procedure used in packaging processes with final shrinking or pre-shrinking stages for the laminates.

[0021] The solution of removing the heat forming stage resolves the problems associated with stretching the plastic and also reduces packaging manufacturing costs as a thicker gauge plastic is not required for the final laminate and costs linked to heat production are removed; Furthermore, as a fixed moulding system is not required, the system offers greater versatility.

[0022] Other details and characteristics shall be shown throughout the description below referring to drawings attached to this report which show the different parts of the procedure for illustrative purpose but not limiting the invention.

[0023] Below is a list of the main parts in the stated procedure showing the number sin the attached diagrams;

(10)- Lower reel;
(11)- Lower laminate;
(12)- Upper laminate;
(13)- Stretched lower laminate;
(14)- Longitudinal fold;
(15)- Product;
(16)- Clamps;
(17)- Chain;
(18)- Upper reel;
(19)- Concave surface of (27);
(20)- Transverse rods;
(21)- Rolling station;
(22)- Lower laminate stretching station (11);
(23)- Stretched laminate positioning station (13) in the pulling system;
(24)- Product introduction station (15) and lower surface shaping (19) of the package (27);
(25)- Upper laminate positioning station (12);
(26)- Vacuum forming and edge welding station (28);
(27)- Package;
(28)- Shape of (27);
(29)- Transversal base of (13);
(30)- Longitudinal base of (13);
(31)- Width of (11);
(32)- Welded strip;
(33)- Blowing device;
(34)- Support roller;
(35)- Unfolded lower laminate;
(36)- Intermediate separator; and
(37)- Cavity.

Figure 1 is a plan view of the product vacuum packaging process (15) using two different laminates being the subject matter of the invention.

Figure 2 is a front view of the product vacuum packaging process (15) using two different laminates being the subject matter of the invention.

Figures 3-6 are side views of the successive lower stretched laminate forming stages (13) tensed by the pulling system until it forms the concave shape of the lower surface (19) of the package (27), being the subject matter of the invention.

Figure 7 is a plan view of the vacuum packaging process using two different laminates to obtain a "pack" with two cavities (37), being the subject matter of the invention.

[0024] As shown in Figures 1 and 2, the automated product vacuum packaging process (15) using two different laminates has different successive stages, firstly the lower laminate (11) is unrolled (21) from the lower reel (10), then it enters the laminate stretching station (22) where its width is cut (31) to a width (29) using a central longitudinal fold (14), then the lower stretched laminate (13) enters the pulling system (23), being held tense to the two chains (17) by several clamps (16) and transversally by two rods (20), then the product is placed inside (15) through the upper section whereby the stretched laminate (13) is unfolded or folded over due to the force of its own weight (24) to shape the unfolded laminate (35), having a concave surface (19) due to the product being supported (15).

[0025] In addition, other methods may be applied such as applying pressure or a blowing process to facilitate the unfolding of the laminate (13). Then the (25) upper strip upper (12) is positioned from the upper reel upper (18) onto the product (15), see Figure 2, and finally reaches the welding station (26) the shape of the package is sealed (28) using four welded strips (32), one on each side. In this way, the package (27) will be prismatic with a slightly rectangular base.

[0026] Figure 2 shows the support rollers (34) on the lower section of the chain (17) to support the weight of the product (15), and moreover shows how the lower laminate is supported by the transversal bases (29) by cylindrically shaped rods (20) driving the laminate by the upper section of the same.

[0027] In the current implementation which is the purpose of the invention the package (27) obtained by this stated process has a prismatic shape (see Figure 1), however there is also the option of making packages in different shapes for example with an elliptical base with, instead of four welded edges (32) there is one single seam following the perimeter of the package (27).

[0028] Figures 3-6 shows the successive steps in folding the laminate (13) from where it is held tense to the pulling system by several clamps (16), see Figure 3, until the same acquires its concave shape (19) on the lower surface of the package (27), see Figure 6, by applying blown air (33) and the force of the product's weight (15), see Figures 4-5.

[0029] Figure 7 shows the stated procedure for the stated manufacture of "packs", specifically with two equal cavities (37). The procedure is very similar to individual packaging but with the difference that there is an intermediate separator (36) parallel to the two chains (17) creating two different cavities (37). Moreover, instead of making one single fold (14) to cut the lower laminate (11) there are two folds, one for each cavity (37). Finally there are five welded edges (32) instead of four.

[0030] Having sufficiently described this invention using the Figures attached, it is easy to understand that any changes judged to be suitable may be made, whenever these changes do not alter of the essence of the invention summarised in the following claims.

Claims

1. "PROCEDURE TO SHAPE THE LOWER SURFACE OF PACKAGING WITHOUT APPLYING HEAT DURING A VACUUM PACKING PROCESS" in which the automated, series manufacturing process is used to shape the lower surface of a package with it being shaped from two different thin plastic laminates from two different reels which are sealed by one or more welded strips around the edge, **characterized by** the fact that the first stage consists of stretching the lower laminate (11) which cuts the initial width (31) of the same into a thinner width (29), then the stretched laminate (13) is tensed in the pulling system formed by two parallel chains (17) separated by a certain distance, holding the aforementioned laminate (13) to the chains (17) using retaining methods and transversally by two rods (20) separated by a certain distance, the product being then positioned (15) onto the laminate (13) and using its own weight unfolds the laminate to acquire a concave shape (19) required for the packaging (27).

2. "PROCEDURE TO SHAPE THE LOWER SURFACE OF PACKAGING WITHOUT APPLYING HEAT DURING A VACUUM PACKING PROCESS" according to the first Claim, **characterised by** the fact that conventional assistance methods may be included to shape the lower surface (19) of the packaging (27).

3. "PROCEDURE TO SHAPE THE LOWER SURFACE OF PACKAGING WITHOUT APPLYING HEAT DURING A VACUUM PACKING PROCESS" according to the first and second Claims, **characterised by** the fact that the methods used to shape the lower surface (19) of the packaging (27) may be by applying force from a piston or similar means.

4. ""PROCEDURE TO SHAPE THE LOWER SURFACE OF PACKAGING WITHOUT APPLYING HEAT DURING A VACUUM PACKING PROCESS" according to the first and second Claims, **characterised by** the fact that the methods used to shape the lower surface (19) of the packaging (27) may be by blowing or sucking air.

5. "PROCEDURE TO SHAPE THE LOWER SURFACE OF PACKAGING WITHOUT APPLYING HEAT DURING A VACUUM PACKING PROCESS" according to the first Claim, **characterised by** the fact that the methods used to cut the width of the lower laminate (11) before entering the pulling system are by making one or more folds or creases.

6. "PROCEDURE TO SHAPE THE LOWER SURFACE OF PACKAGING WITHOUT APPLYING HEAT DURING A VACUUM PACKING PROCESS" according to the first Claim, **characterised by** the fact that the methods used to hold the lower laminate to the chain pulling system (17) are clamps (16).

7. "PROCEDURE TO SHAPE THE LOWER SURFACE OF PACKAGING WITHOUT APPLYING HEAT DURING A VACUUM PACKING PROCESS" according to the first Claim, **characterised by** the fact that the rods (20) have a cylindrical shape and are used to support the lower laminate on their two transverse bases (29), with the upper surface of said rods (20) driving the laminate.

8. "PROCEDURE TO SHAPE THE LOWER SURFACE OF PACKAGING WITHOUT APPLYING HEAT DURING A VACUUM PACKING PROCESS" according to the first Claim, **characterised by** the fact that the distance between the chains (17) in the pulling system will depend on the width of the final packaging (27), and will be almost the same as the width of the said final packaging (27).

9. "PROCEDURE TO SHAPE THE LOWER SUR-

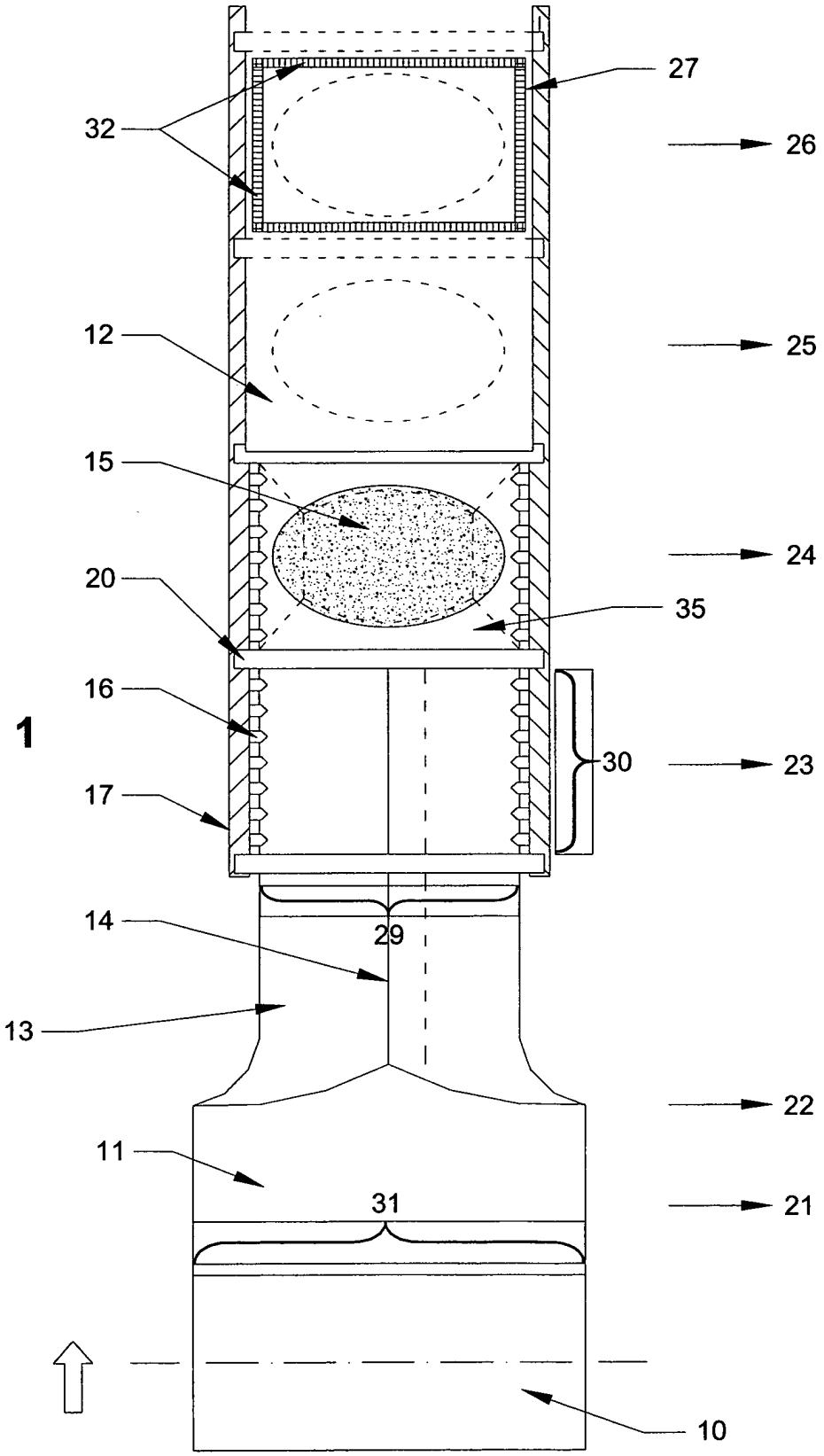
FACE OF PACKAGING WITHOUT APPLYING HEAT DURING A VACUUM PACKING PROCESS" according to the first Claim, **characterised by** the fact that the distance between the rods (20) depend on the width of the final packaging (27), and will be almost the same as the width of the said final packaging (27).

10. "PROCEDURE TO SHAPE THE LOWER SURFACE OF PACKAGING WITHOUT APPLYING HEAT DURING A VACUUM PACKING PROCESS" according to the first Claim, **characterised by** the fact that there will be supports on the lower section of the pulling system using chains (17) so that when the product (15) is placed inside the lower laminate to form the concave shape of the package, the aforementioned product (15) is lightly supported by the methods.

11. "PROCEDURE TO SHAPE THE LOWER SURFACE OF PACKAGING WITHOUT APPLYING HEAT DURING A VACUUM PACKING PROCESS" according to the first and tenth Claims, **characterised by** the fact that the support means are a line of rollers.

12. "PROCEDURE TO SHAPE THE LOWER SURFACE OF PACKAGING WITHOUT APPLYING HEAT DURING A VACUUM PACKING PROCESS" according to the first Claim, **characterised by** the fact that the procedure may be used to manufacture "packs", i.e. packages with more than one cavity (37), in which there will be one or more intermediate separators parallel to the chains (17).

Fig. 1



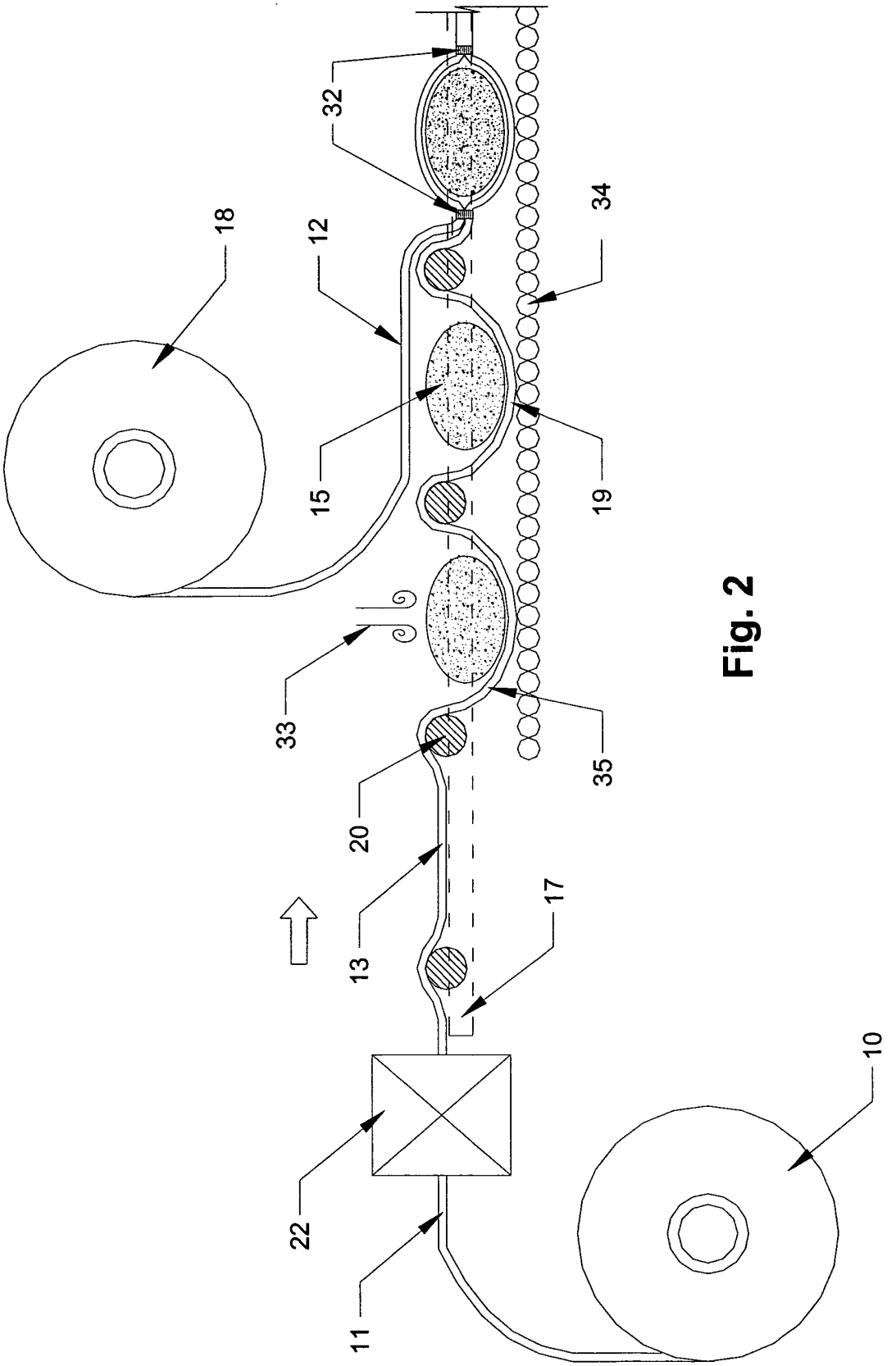


Fig. 2

Fig. 3

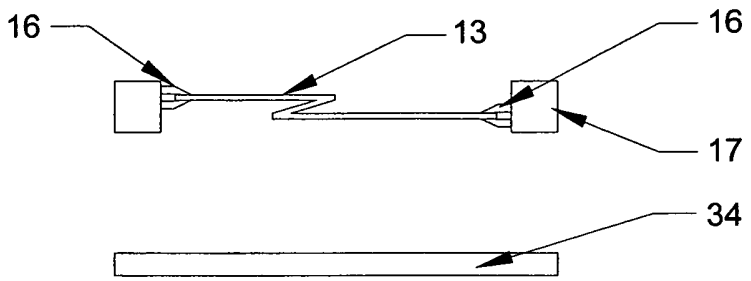


Fig. 4

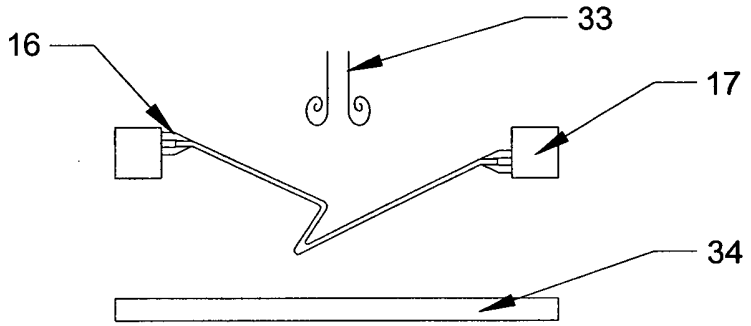


Fig. 5

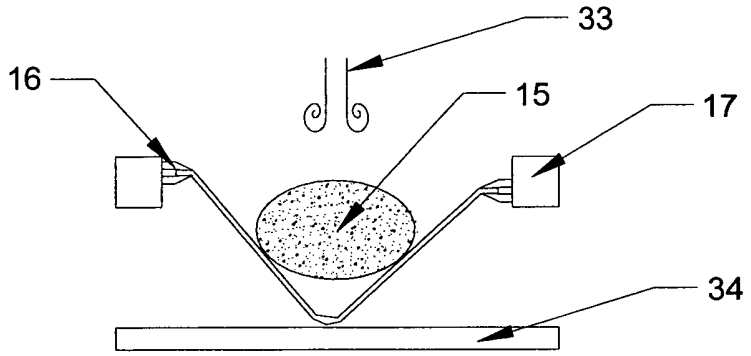


Fig. 6

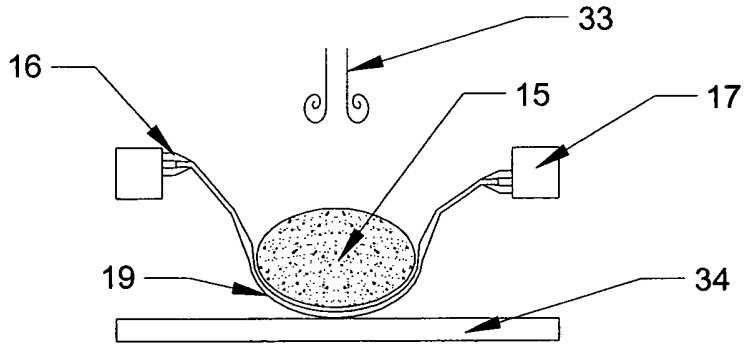
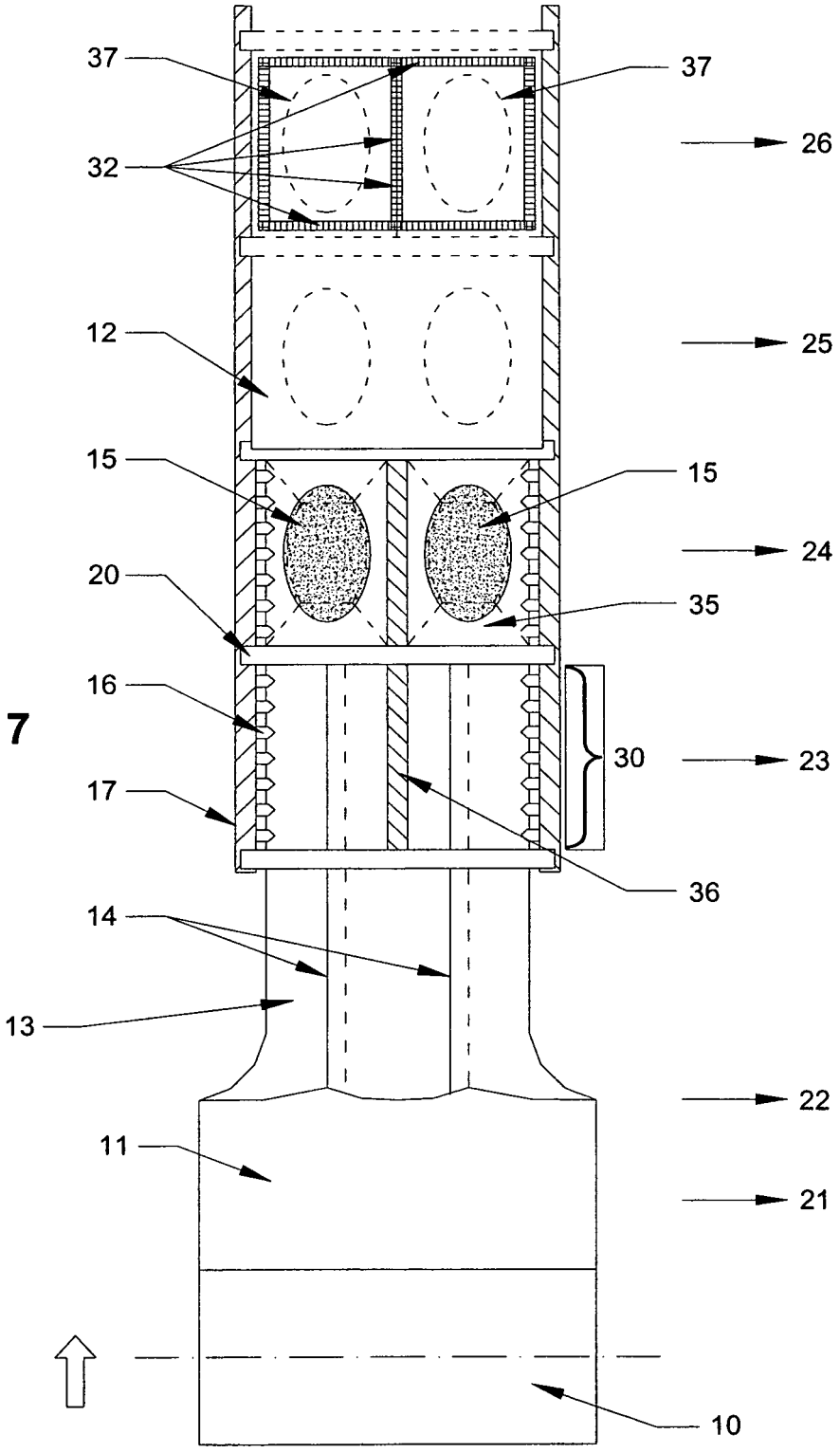


Fig. 7



INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES 2006/000718

A. CLASSIFICATION OF SUBJECT MATTER

B65B 11/50 (2006.01)
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	FR 2405120 A1 (APPLIC PLASTIQUE MEC ELEC) 04.05.1979, the whole the document	1-12
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☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 May 2007 (21.05.2007)	(28/05/2007)
Name and mailing address of the ISA/ O.E.P.M. Paseo de la Castellana, 75 28071 Madrid, España. Facsimile No. 34 91 3495304	Authorized officer Mª R. Revuelta Pollán Telephone No. +34 91 3496824

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