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(11) **EP 1 609 720 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**28.12.2005 Bulletin 2005/52**

(51) Int Cl.7: **B65B 9/20, B65B 51/30**

(21) Application number: **05013221.6**

(22) Date of filing: **20.06.2005**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR**  
Designated Extension States:  
**AL BA HR LV MK YU**

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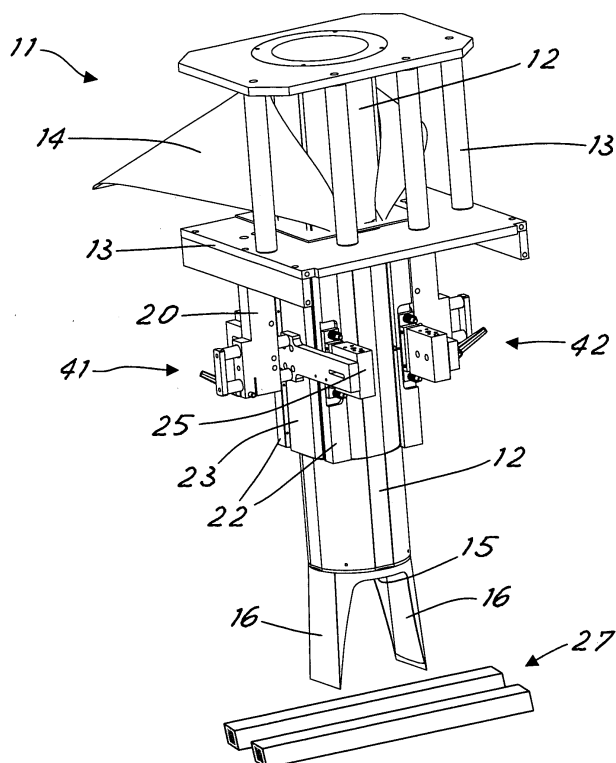
(30) Priority: **24.06.2004 IT MI20040312 U**

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(54) **Tubular bag making machine for the formation of bags with lateral shaping edges**

(57) A vertical bagging machine for the formation of bags in plastic film comprising a pipe with a substantially circular or oval cross-section (12) for delivering product around which is formed and guided from top to bottom a pipe of plastic film and transverse sealing means (27) of the pipe of film arranged downstream of the bottom end of the delivery pipe to form a sequence of closed

bags containing the delivered product, characterised in that along the delivery pipe (12) there is means for the formation of longitudinal folds along a pipe of film and sealing means of said folds, guide means (16) being arranged at the bottom end of the delivery pipe to give the pipe of film a rectangular section with said folds at the corners of the rectangular section.



**Fig. 1**

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## Description

**[0001]** The present invention refers to a vertical bagging machine, intended for packaging with bags provided with strengthening and lateral shaping edges and square bottoms (sometimes also called "stabilo" bags).

**[0002]** It is known to make vertical bagging machines provided with a delivery pipe placed vertically or according to a desired tilt on which a tube of plastic film is formed and guided from top to bottom starting from a web of continuous film. Downstream of the bottom end of the delivery pipe (from which the quantity of product to be formed is bagged at each advance step of the pipe of film) transverse sealing means and blanking means are provided (which may be provided with shaping means, for example square, of the bottom of the bag) intended to form a sequence of bags containing the delivered product. The delivery pipes of such machines typically have a circular (or at least oval) section and enable high packaging speed to be obtained and the possibility of jamming to be minimised. Nevertheless, the known vertical machines are not suitable for making parallelepiped shaped bags, such as the so-called "stabilo" bags.

**[0003]** "Stabilo" bags are bags provided with four vertical sealed folds to form four lateral edges; the presence of the edges gives the bag a shape that is similar to that of a parallelepipedon that is able to be free-standing by resting on its rectangular base.

**[0004]** For packaging with "stabilo" bags, vertical machines have been proposed having a delivery pipe with a rectangular section in order to encourage the formation of lateral edges and to give the section of the pipe of film an appropriate shape at the moment of transverse sealing of the bag. On the external surface of the delivery pipe appropriate guide flaps are arranged that are intended to form four longitudinal folds in the pipe of film, which are then pinched and sealed to form the lateral shaping edges.

**[0005]** These machines nevertheless have a series of drawbacks that are not completely negligible, especially when the product to be packaged has a shape or nature that tends to jam in the pipe, due to the small passage "gap" of the pipe, and when high productivity and bagging speed are required. The square shape of the cross-section of the delivery pipe (with the same perimeter of the section of the pipe of film) does not permit a wide area to be obtained for the delivery flow of the product, as the bagging process is not very reliable and cannot be generally slowed down. In fact, owing to the shape of the pipe, bagging machines with "stabilo" bags often suffer from jamming problems, making frequent operator interventions necessary and further reducing the device's productivity.

**[0006]** The general object of this invention is to overcome the drawbacks mentioned above by providing a bagging machine for packaging with "stabilo" bags that enables high bagging speed and a satisfactory produc-

tivity level to be achieved. A further object is to make a bagging machine that is reliable and has a simple and economical structure.

**[0007]** In view of this object, it was decided to create, according to the invention, a vertical bagging machine for forming bags in plastic film comprising a pipe with a substantially circular and oval cross-section for delivering the product around which are formed and guided from top to bottom a pipe of plastic film and transverse sealing means of the pipe of film arranged downstream of the bottom end of the delivery pipe for forming a sequence of closed bags containing the delivered product, characterised in that along the delivery pipe there is means for the formation of longitudinal folds along the pipe of film and sealing means of said folds, guide means being arranged at the bottom end of the delivery pipe to give the pipe of film a rectangular section with said folds at corners of the rectangular section.

**[0008]** In order to make the explanation of the innovative principles of the present invention and its advantages in relation to the state of the art clearer, a possible embodiment applying such principles will be disclosed below by way of example with the help of attached drawings. In the drawings:

- figure 1 is a perspective view of a bagging machine made according to the present invention,
- figure 2 is another perspective view of the bagging machine in figure 1 with some parts removed,
- figure 3 is a detail of the bagging machine of the preceding figures,
- figure 4 is a view of a bag made with the machine according to the invention,
- figure 5 is a section view of the pipe of film inside the machine just before the stage of transverse sealing,
- figure 6 is a view of the section of pipe of film at the point for delivering the product to be packaged.

**[0009]** With reference to the figures, figure 1 shows a vertical bagging machine 11 for the formation of bags equipped with four sealed side folds for making lateral stabilisation edges; these bags, an example of which is shown in the example in figure 4, are known in the packaging field as "stabilo" bags.

**[0010]** The bagging machine 11 comprises a delivery pipe 12 (which may be vertical or be arranged according to a desired tilt) around which a pipe of continuous plastic film is guided from top to bottom. The pipe of film is formed around the delivery pipe 12 by appropriate means 14 starting from a web of continuous film that is supplied to the machine (not shown in the figure). The means 14 comprises a guide profile arranged near the top end of the delivery pipe 12 and is made according to techniques known in the field of bagging with vertical machines; the means will therefore not be disclosed with further details.

**[0011]** The delivery pipe 12 has a top opening up-

stream of which there is arranged known means of dosing the product to be packaged (not shown in the figure). The pipe of film that forms around the delivery pipe 12 runs from top to bottom, dragged by known movement means (not shown). Dragging is indexed, to enable closing sealing of a bag at each advance step of the pipe of film downwards.

**[0012]** The pipe 12 is fixed to a support structure 13 on which the means 14 is also mounted for winding the film around the delivery pipe 12.

**[0013]** Figure 2 shows the bagging machine according to the invention with some parts removed. Note, at the height of the profile 14 for winding the web of film, the folding means 29, 30 and 31, which have the function of forming two longitudinal folds which extend to the outside in the pipe of film wrapped around the delivery pipe 12.

**[0014]** In figure 3, where the winding profile 14 has been removed, the folding means is more visible. The two vertical ribs 31 are fixed to the delivery pipe 12 and are intended to stay inside the pipe of film (not shown) during operation of the machine. The two flaps 30, on the other hand, are fixed to the support structure 13, just like the guide body 29. The guide body 29 is arranged between the two ribs 31, whereas the flaps 30 are positioned to the side of the ribs 31, parallel to them. During bagging, the flaps 30 and the guide 29 remain outside the pipe of film and with the ribs 31 define two thin gaps that are suitable for forming two folds protruding outside the pipe of film. On the opposite side of the delivery pipe very similar folding means 60, 61 is arranged, which forms two folds that mirror the two formed by the means 29, 30 and 31. Once it has passed through the folding means, the pipe of film assumes a cross-section that is similar to the one shown in figure 6, with the folds 51 protruding parallel to one another towards the outside from the pipe of film with a circular section. Note in fact that the ribs 31, in an embodiment of the invention, protrude parallel to one another from the delivery pipe.

**[0015]** Immediately downstream of the folding means appropriate sealing means is arranged that is intended to pinch and seal the previously formed folds. To each folding unit a sealing unit corresponds. Below the folding unit 29, 30 and 31 the sealing unit 41 is arranged, that is intended to seal the two folds formed by the corresponding folding means. The sealing unit 41 is supported by an arm 20 fixed to the support structure 13 and comprises a pair of vertical sealing blades 22, moved hydraulically or pneumatically by known drive means 25. The two blades 22 are suitable for closing in the direction of the contrast body 23 to pinch the longitudinal folds formed upstream of the corresponding folding means at each advance step of the film downwards. The blades 22 and the contrast body 23 are arranged vertically and have an elongated shape, in particular, their length must be at least the same as the height of a bag, to ensure the formation of the side edges along the entire extent of the pipe of film.

**[0016]** On the side diametrically opposite the delivery pipe 12 the second sealing unit 42 is arranged, which is completely similar to the sealing unit 41 and is intended to operate on the longitudinal folds formed by the folding means 60, 61.

**[0017]** According to techniques known in the field of vertical bagging, the machine could also comprise further longitudinal sealing means, intended to close longitudinally the pipe of film wound around the delivery pipe 12. Normally however, the longitudinal closure of the pipe occurs at one of the four seams of the folds 51, avoiding a further fifth seam being made on the pipe of film.

**[0018]** At the bottom end of the delivery pipe 12 the delivery port 15 is made from which the product to be packaged emerges (see figure 1). The delivery pipe 12 is shaped with a virtually circular cross-section along its entire extent as far as the delivery port 15. The pipe section could be oval or have similar shapes (without sharp corners). This solution enables the maximum area to be obtained for the product delivery flow with the same perimeter of the cross-section of the pipe of film. In this way it is possible to minimise the time for delivering product, accelerating the overall bagging process.

**[0019]** Downstream of the delivery port 15 there is arranged means 16 to give the pipe of film a virtually rectangular cross-section. The means 16 comprises a pair of guides 16 that push on the walls of the film from the inside of the pipe, gradually deviating the rectangular cross-section from the circular shape to the rectangular shape. The two guides 16 extend from the port 15 downwards and have an angular position in relation to the folding means such that the sealed longitudinal folds are at the top of the rectangular section of the pipe of film. Figure 5 shows the section that the pipe of film assumes downstream of the guides 16, with the sealed folds 51 at the tops of the rectangle described by the pipe. Note that advantageously, the terminal part of the guides (or walls) 16 defines the short side of the rectangle described by the rectangular cross-section of the pipe of film. This solution enables it to be prevented that the walls 16 interfere in some way with the delivery flow, as they broaden out slightly as they move further away from the axis of the delivery pipe.

**[0020]** At a lower height in relation to the guides 16 known transverse sealing means 27 is arranged (shown schematically in figure 1), possibly equipped with known means for shaping (for example square) of the bottom of the bag. At each advance step of the pipe of film, the transverse sealing means 27 carries out a closing seal of the bags to form a sequence of bags starting with the continuous pipe of film. Sealing is performed parallel to two walls of the pipe of film, in such a way as to make a bag with a shape similar to that of a parallelepipedon.

**[0021]** According to known techniques, at the transverse sealing means 27 means can be arranged to cut the bag that has just been formed from the pipe of film.

**[0022]** At this point, it is clear that the objects of the

present invention have been achieved. In particular, a bagging machine has been made for the formation of "stabilo"-type bags that is able to reach high packaging speeds and high productivity. In fact, the circular section of the delivery pipe enables the time to be minimised for delivering product with the same bag dimension, thereby speeding up the total bagging process. Furthermore, it has been found that the machine according to the invention enables the frequency of jams and blockages to be reduced, contributing to increasing further the productivity of the machine.

**[0023]** Naturally, the above disclosure of an embodiment applying the innovative principles of the present invention is given by way of example of such innovative principles and must therefore not be taken as a limitation to the scope thereof claimed under civil law.

## Claims

1. Vertical bagging machine for the formation of bags in plastic film comprising a pipe with a substantially circular or oval delivery section (12) of the product around which is formed and guided from top to bottom a pipe of plastic film and transverse sealing means (27) of the pipe of film arranged downstream of the bottom end of the delivery pipe for the formation of a sequence of closed bags containing the delivered product, **characterised in that** along the delivery pipe (12) means is present for the formation of longitudinal folds along a pipe of film and sealing means of said folds, at the bottom end of the delivery pipe there being arranged guide means (16) to give the pipe of film a rectangular section with said folds at sharp corners of the rectangular section.
2. Bagging machine according to claim 1, **characterised in that** said means for giving the pipe of film a rectangular shape comprises a pair of guides (16) that extends opposite the bottom end (15) of the delivery pipe downwards.
3. Bagging machine according to claim 2, **characterised in that** each guide (16) comprises a wall, the bottom end part of which defines a short side of the disclosed rectangle from the section of the pipe of film to the moment of transverse sealing.
4. Bagging machine according to claim 1, **characterised in that** said means for folding comprises two folding units, each of which comprises a pair of longitudinal ribs (31) fixed to the delivery pipe (12), a guide body (29) arranged between the two ribs (31) and a pair of longitudinal flaps (30) arranged laterally in relation to the ribs (31), said guide body and said flaps being fixed to a support structure and defining with the ribs (31) a thin gap traversed by the wall of the pipe of film for forming a pair of protruding

folds.

5. Bagging machine according to claim 4, **characterised in that** the two folding units are arranged diametrically opposite in relation to the delivery pipe (12).
6. Bagging machine according to claim 4, **characterised in that** said means for sealing the folds comprises two sealing units (40, 41), each of which comprises a contrast body (23) arranged underneath the guide body (29) of a folding unit and a pair of vertical sealing blades (22) arranged on opposite sides of the contrast body, each blade (22) being suitable for pinching a preformed fold in cooperation with a vertical side of the contrast body (23).
7. Bagging machine according to claim 1, **characterised in that** it comprises a guide profile (14) near the top end of the delivery pipe to form around the latter the pipe of film starting with a continuous supply of film web, said folding means being arranged at the height of said guide profile (14).

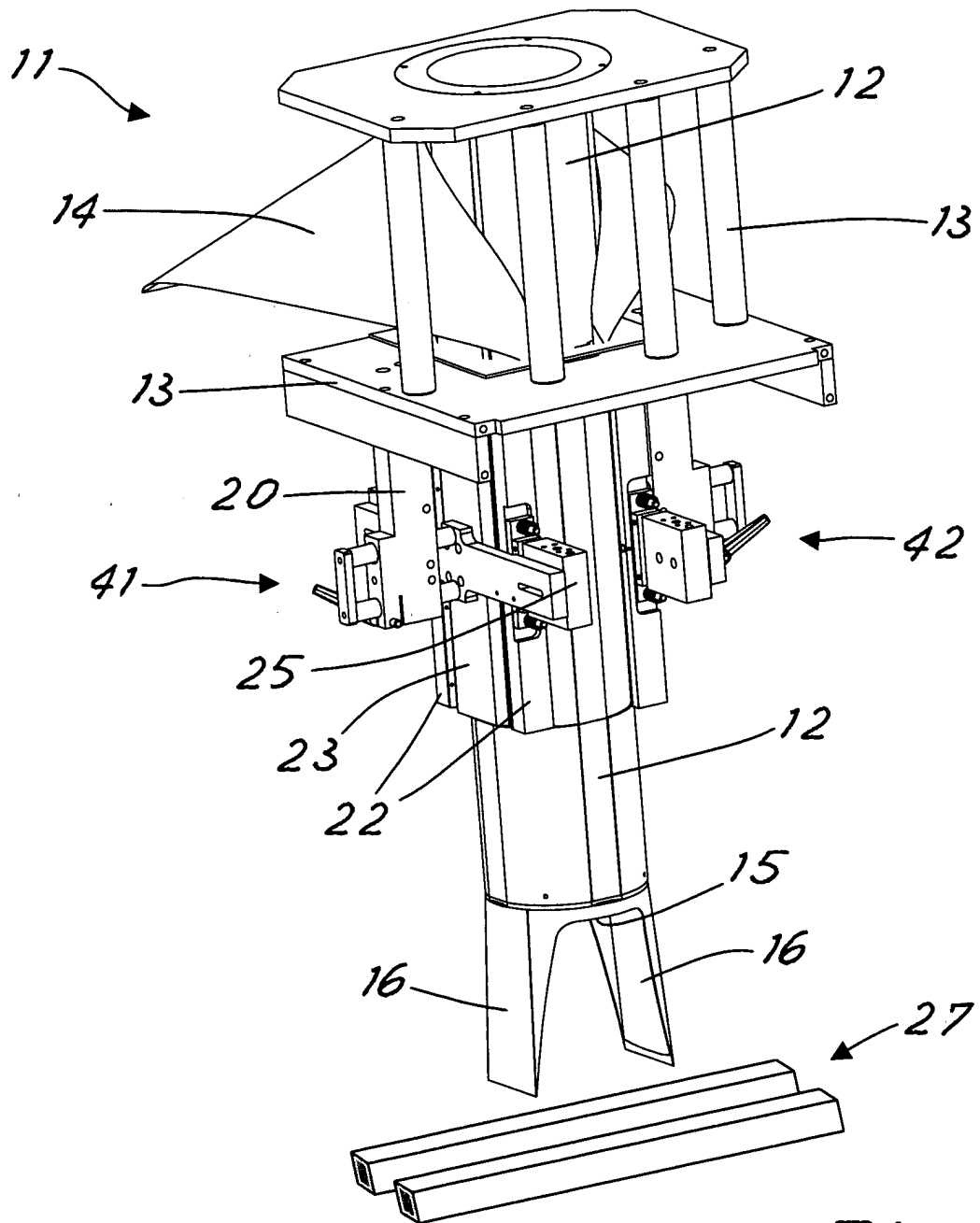


Fig.1

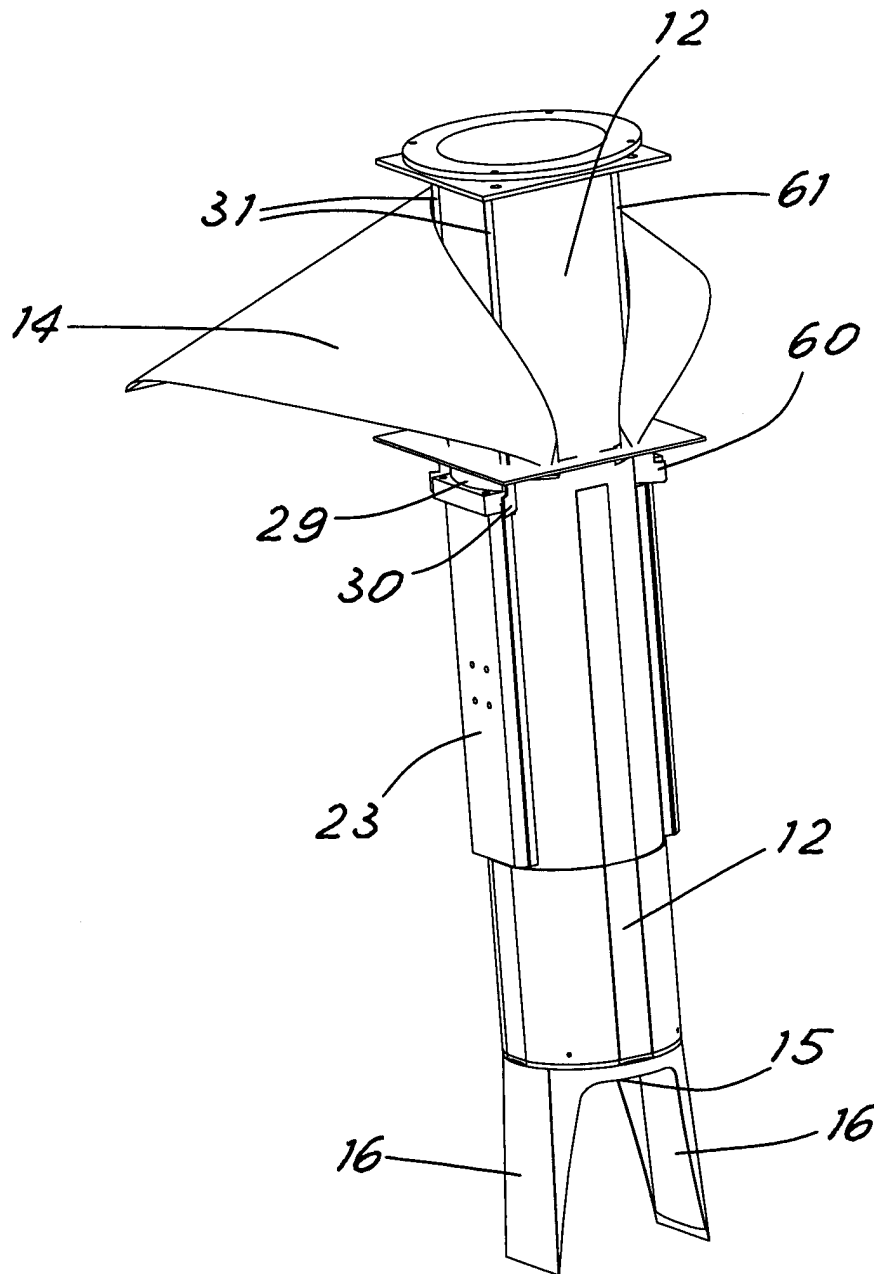


Fig. 2

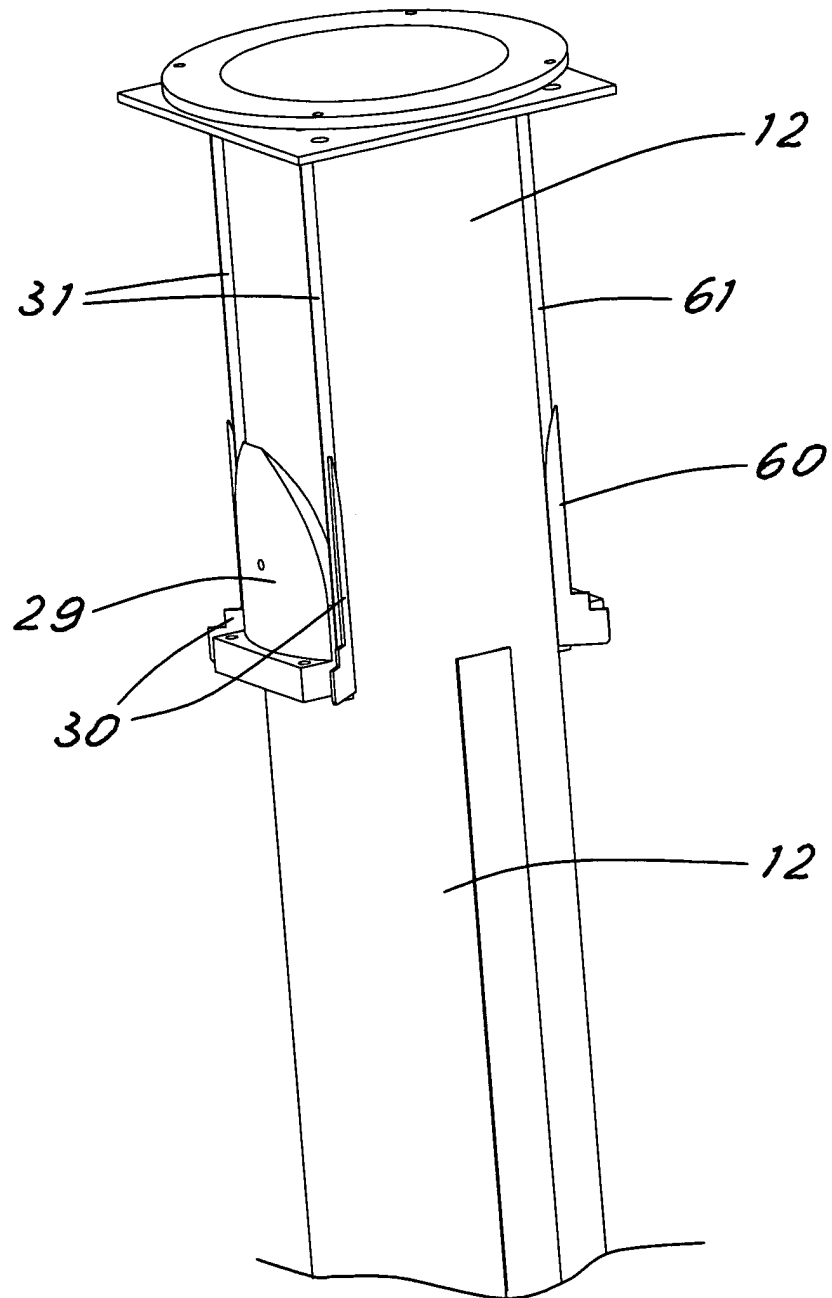


Fig. 3

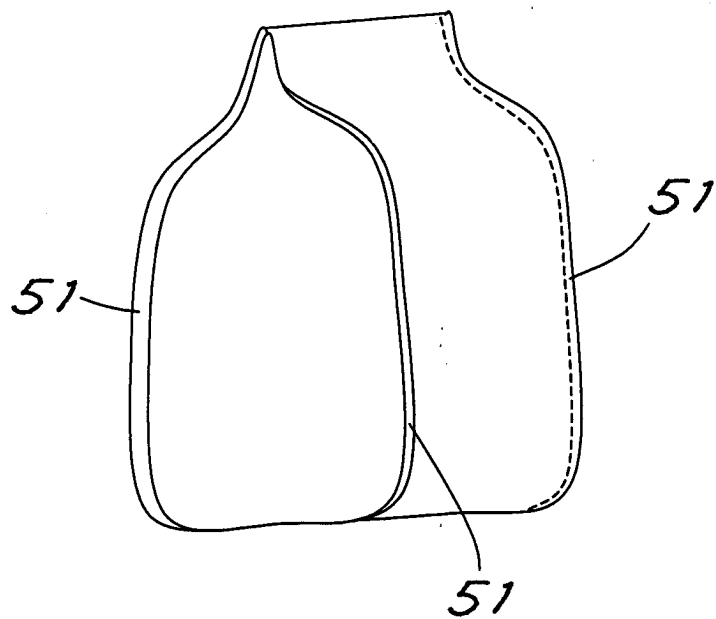


Fig. 4

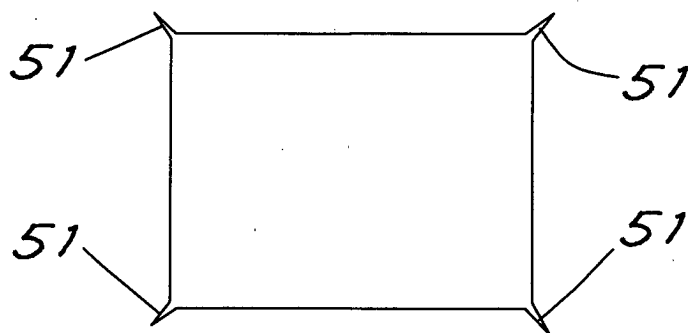


Fig. 5

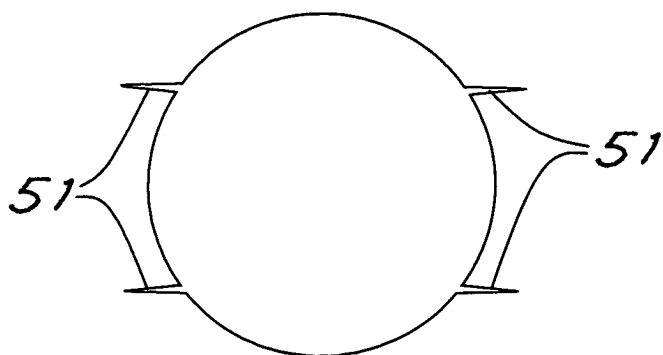


Fig. 6



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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                  |                                                              |                                                     |
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