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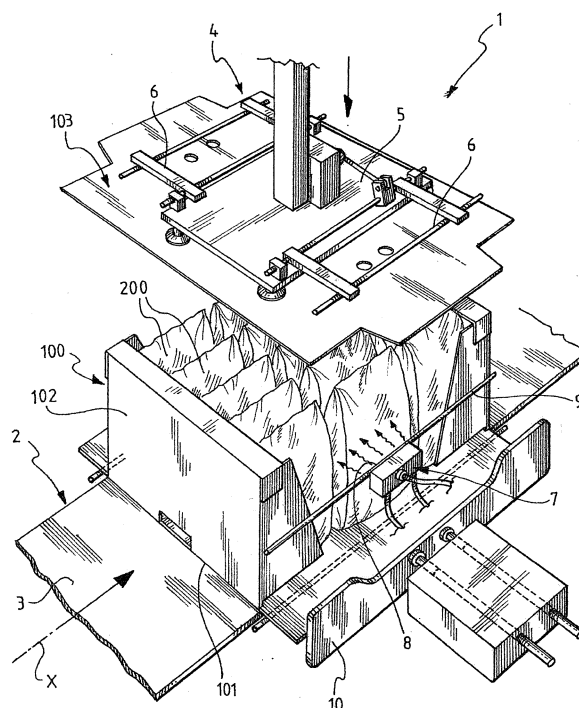
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(54) **Method for closing packages in a case packer and a package closing station of a case packer**

(57) A method for closing packages in a case packer comprises arranging a first packaging portion (100) containing pillow bags (200) so as to define two opposite first side walls (102) and two side openings between the first side walls (102), feeding the first packaging portion (100) to a closing station (1), positioning a second packaging portion (103) onto the first packaging portion (100) and

folding two second side walls (104) to close said opposite side openings, at least during the positioning of the second packaging portion (103) onto the first portion, directing a compressed air flow towards the two opposite side openings so as to hold the pillow bags (200) within the first packaging portion (100).



**Fig. 1**

## Description

### Application field

**[0001]** The present invention relates to a method for closing packages in a case packer and a relative package closing station of a case packer.

**[0002]** The present invention finds a particular use in case packers intended to form packages of an expositive type, containing pillow bags for salty snacks. By pillow bags is meant, in the context of the present invention, bags with symmetric upper and lower weldings made of a plastic film suitable to contain food products under protected conditions. The pillow bags on which the case packer according to the present invention is intended to operate are pillow bags containing salty snacks preferably having a bulk density ranging between 0.02 and 0.1 Kg/liter. An example of such pillow bags, which will be explicitly referred to herein below, is given by bags containing chips or the like. By case packer is meant, in the context of the present invention, a machine that is capable of forming a box, usually made of cardboard, intended to contain a plurality of pillow bags.

### Description of the prior art

**[0003]** The pillow bags containing salty snacks are usually cased at the manufacturing plant in order to be able to be transported and subsequently sold. A type of boxes (or packages) that is advantageously used, referred to as a display case or box, allows both containing in an ordered manner the pillow bags for the transport thereof, and acting as a display stand for the retail sale of the pillow bags. Usually, the packages of a displaying type are made of a first portion comprising a support base and two opposite side walls (between which two side openings are defined), and a second portion comprising a top wall and two further opposite side walls that close the side openings of the first packaging portion. By mutually coupling the two packaging portions, a closed box containing the pillow bags is obtained. By removing the second portion, the top wall and two side walls are removed, leaving the pillow bags contained in the lower portion and at view for an immediate withdrawal and purchase. In order to be able to suitably display the pillow bags, the side walls that are removed, i.e. those belonging to the second portion, have to be the side walls intended to contact the front (or rear) surface of the pillow bag, which usually carries the mark of the product, images of the product contained in the bag, and the like.

**[0004]** It shall be apparent that, since the pillow bags are not able to lie in a vertical position in the absence of an abutment or support, when the upper portion of the packaging is removed, it may occur that one or more pillow bags tend to fall, exiting the packaging.

**[0005]** This peculiarity does not originate particular problems when the upper portion of the packaging is removed to provide the pillow bags for the sale, since the

sales clerk more easily arranges the bags back to their proper position. However, this peculiarity originates many problems during the formation of the packaging, particularly when closing the packaging upper portion. In fact, during such operation (which takes place with the pillow bags already positioned within the lower portion of the packaging) possible overturns or falls of the pillow bags from the lower portion cause the inevitable stop of the bagging line (the line forming the packaging around the pillow bags) in order to reposition the bags.

**[0006]** Such interruptions, beside requiring the presence of an operator in charge of rearranging the bags, cause a considerable slowing down in the bagging line, with consequent real production of the packages containing pillow bags much below the nominal manufacturing rate of the same line. Furthermore, the manufacturing rate of the bagging line can be hardly assessed, due to the imponderability of the frequency with which the operator has to intervene, thus making the proper dimensioning of the entire manufacturing plant very difficult.

## SUMMARY OF THE INVENTION

**[0007]** In this context, the technical task underlying the present invention is to propose a method for closing packages in a case packer, and a package closing station of a case packer, which solve the above-mentioned drawbacks of the prior art.

**[0008]** Particularly, it is the object of the present invention to provide a method for closing packages in a case packer and a closing station of packages of a case packer capable of ensuring a real manufacturing rate that is as near as possible to the nominal manufacturing rate. A further object of the present invention is to propose a method for closing packages in a case packer and a closing station of packages of a case packer which do not need an operator in charge of supervising and interacting with the closing station to ensure the efficiency thereof. The indicated technical task and the specified objects are substantially achieved by a method for closing packages in a case packer and a package closing station of a case packer comprising the technical characteristics set forth in one or more of the appended claims.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0009]** Further characteristics and advantages of the present invention will be more clearly apparent from the illustrative, hence non-limiting, description of a preferred, but not exclusive, embodiment of a method for closing packages in a case packer and a package closing station of a case packer, as illustrated in the appended drawings, in which:

- Figs. 1 to 4 schematically show a package closing station of a case packer according to the present invention in different operative steps.

## DETAILED DESCRIPTION

**[0010]** A package closing station of a case packer in accordance with the present invention has been generally indicated by the number 1 in Fig. 1.

**[0011]** The station 1 comprises a transport line 2, which is arranged to support and transport packages being formed, i.e. which are to be formed.

**[0012]** The transport line 2 extends along a direction X and comprises a conveyor belt 3, which moves forward by pulses, i.e. it moves forward along the direction X by alternating forward motions and pauses.

**[0013]** The packages are transported on the transport line 2 according to a single ordered row, so that a transport line faces only one packaging being formed at a time at the station 1.

**[0014]** The packages arrive only partially formed at the station 1. In particular, the transport line supplies a first portion packaging 100 defined by a base surface 101 and two first side walls 102 that are mutually opposite. Two opposite side openings open between the first two side walls 102. Within the first packaging portion 100, pillow bags 200 are present, which are tidily arranged in rows and columns, so that the end rows face the side openings, displaying the major surfaces of the same bags at the above-mentioned openings (as shown in Fig. 1). Particularly, the rows of pillow bags are sorted parallel to the advancement direction X of the transport line 2, while the columns are sorted perpendicularly to the transport line 2.

**[0015]** It shall be noticed that the first packaging portion 100 substantially defines the packaging portion acting as the display stand.

**[0016]** The station 1 further comprises supplying members 4 of a second packaging portion 103 in the form of a semi-finished piece. The supplying members 4 are active on the transport line 2 between an active condition, in which they position the semi-finished piece on the packaging, and a waiting position, in which they hold the semi-finished piece 103 moving away from the packaging being formed. The movement between the active condition and the waiting condition of the supplying members occurs through a vertical translation, i.e. a translation perpendicular to the lying plane of the transport line 2, so as to position the semi-finished piece 103 above the first packaging portion 100. In the preferred embodiment of the invention, the supplying members 4 comprise a suctioning table that holds and handles the semi-finished piece 103. The supplying members 4 further comprise actuators 6 intended to fold the semi-finished piece 103 along pre-weakening lines to obtain two opposite second side walls 104 (Fig. 2) of the second packaging portion 103. Such two opposite second side walls 104 perform the function of closing the side openings of the first packaging portion 100 to obtain a completely closed packaging. The actuators 6 are actuated in the active condition of the supplying members 4, i.e., during the positioning of the semi-finished piece onto the first packaging por-

tion. As illustrated in the appended figures, in the preferred embodiment of the invention the actuators 6 comprise folding arms that are mutually opposite and arranged at the portions of the semi-finished piece to be folded.

**[0017]** Advantageously, the station 1 comprises pneumatic members 7 that are active on the transport line and switchable between an active condition, in which they direct a compressed air flow towards the transport line so as to hit the pillow bags 200 at the open side walls of the first packaging portion 100, and an inactive condition, in which they are inactivated. The function of the pneumatic members 7 is to support the pillow bags 200 during the positioning of the second packaging portion 103 onto the first packaging portion 100, preventing the pillow bags (which are not able to vertically lie autonomously) from being able to exit the overall dimensions of the first packaging portion 100. Particularly, the pneumatic members 7 prevent the pillow bags 200 from being able to overturn and fall from the side openings of the first packaging portion 100.

**[0018]** To this aim, the pneumatic members 7 direct a compressed air flow through the side openings of the first packaging portion 100 and against the pillow bags 200, so as to push the latter ones towards the center of the packaging. In the preferred embodiment of the invention, the pneumatic members 7 comprise two pluralities of diffusing nozzles 8 (only one of which is visible in the appended figures), each of which is arranged at a side opening of the first packaging portion 100. The two pairs of pluralities of diffusing nozzles 8 mutually face and are mutually opposite, so as to operate on both openings of the first packaging portion 100 and the corresponding pillow bags. The compressed air flow exiting the nozzles 8 is substantially perpendicular to the extension direction X of the transport line 2 (as schematically shown in Fig. 1).

**[0019]** Preferably, the compressed air flow is dispensed at a pressure ranging between 2 bars and 8 bars, preferably about 4 bars. To this aim, the pneumatic members 7 comprise a compressed air source (not shown) connected with the diffusing nozzles 8 in a *per se* known manner. The diffusing nozzles 8 are arranged at a distance from the pillow bags 200 ranging between 1 cm and 20 cm, preferably ranging between about 1 cm and about 10 cm when they are operating and dispense compressed air.

**[0020]** The station 1 further comprises a pair of cross bars 9 (only one of which is visible in Figs. 1 and 2), which are active at the transport line 2. The cross bars 9 mutually face and are opposite, oriented parallel to the transport line 2 and arranged at the side openings of the first packaging portion 100. The two cross bars 9 are movable between a containment condition (shown in Fig. 1), in which they approach the transport line 2 so as to position themselves at the open side walls of the first packaging portion 100 and to hold the pillow bags 200 within the same packaging, and a moved-away position (shown in Fig. 2), in which they move away from the transport line

2 and do not hold the pillow bags 200. The function of the cross bars 9 is to support the pillow bags 200 during the positioning of the first packaging portion 100 in the station 1 and during the positioning of the supplying members 4 of the semi-finished piece 103 that forms the second packaging portion.

**[0021]** When the supplying members 4 are switched to the active position, the cross bars 9 move away from the packaging in order not to mechanically interfere with the actuators 6 and to allow a proper formation of the packaging.

**[0022]** It shall be noticed that the action of the pneumatic members 7 is particularly efficient exactly during the supplying members 4 activation and during the cross bars 9 moving away, since in this step (which, operatively, has a duration ranging between 0.5 and 3 seconds) the pillow bags facing the openings of the first packaging portion 100 are not physically or mechanically abutted on by any supports.

**[0023]** In the preferred embodiment of the invention, the pneumatic members 7 are at least partially integral to the cross bars 9. Particularly, the diffusing nozzles 8 are positioned on the cross bars 9 and integral thereto. During the cross bars 9 handling between the containment condition and the moved-away condition, the diffusing nozzles 8 dispense compressed air that holds the pillow bags in place within the first packaging portion 100.

**[0024]** As the actuators 6 folds the semi-finished piece so as to define the second side walls 104, the pillow bags 200 are abutted by such second side walls 104 and remain in place.

**[0025]** In order to allow a complete closure of the packaging about the pillow bags 200, the station 1 comprises a pair of pushing plates 10, each of which activates at the transport line 2 to push respective lower edges 105 of the first packaging portion 100 against the second side walls of the second packaging portion 104. The pair of pushing plates 10 is switchable between an active position, in which they compress the lower edges 105 against the packaging being formed (Fig. 4) and a rest position, in which they lie away from the packaging being formed (Fig. 1). The function of the lower edges 105 is to abut against the second side walls and to stably and reliably close the packaging (as shown in Fig. 4). The pushing plates 10 are preferably actuated pneumatically, so as to use the same compressed air source that is used for the pneumatic members 7. The pushing plates 10 are preferably heated or heatable to be able to activate a film of glueing material present on the semi-finished piece 103 or on the first packaging portion 100 and to stably join the second side walls 104 to the lower edges 105.

**[0026]** The method for closing packages in a case packer in accordance with the present invention (already partially described above) provides for arranging the first packaging portion 100, containing pillow bags 200, so as to define the base surface 101, the two opposite first side walls 102 and the two opposite side walls that are obtained between the two first side walls 102.

**[0027]** The first packaging portion 100 is supplied to the closing station 1, where the second packaging portion 103 is arranged, defining a top part and the two opposite second side walls 104 intended to close the side openings of the first packaging portion 100. The two cross bars 9 are arranged near to the openings of the first portion to hold the pillow bags 200 within the first packaging portion before positioning the second packaging portion on the first packaging portion (Fig. 1).

**[0028]** The second packaging portion 103 is then lowered onto the first packaging portion 100 and the actuators 6 start bending the second side walls to close the side openings of the first packaging portion 100. The two cross bars 9 are contextually moved away from the packaging being formed to avoid interfering with the bending of the second side walls 104.

**[0029]** At least during this step (illustrated in Fig. 2), a compressed air flow is directed towards the two opposite side openings so as to mechanically hold the pillow bags (which are not mechanically abutted anymore) within the first packaging portion 100.

**[0030]** The two side walls are then folded onto the openings that display the pillow bags (Fig. 3), at least partially abutting against the pillow bags and holding them in place. In this step, the cross bars 9, and the diffusing nozzles 9 with them, are completely moved away from the packaging in order not to interfere with the stroke of the pushing plates 10, which start approaching the packaging to close the lower edges 105 and to fold them onto the second side walls 104. As the second side walls 104 are completely folded onto the first packaging portion 100, the pushing plates 10 press the edges on such side walls 104 to completely close the displaying packaging. In this step, the pushing plates 10 may be heated to activate an adhesive material film and to glue the edges onto the side walls 104.

**[0031]** The so-closed packaging is advanced in order to reach a further station of the case packer and a new first packaging portion 100 containing pillow bags 200 is supplied to the station 1 to start again a new closing cycle.

**[0032]** The described station 1 and method achieve the proposed objects.

**[0033]** In fact, the compressed air flow allows keeping the pillow bags in place (which are not capable, due to their peculiar shape, of autonomously supporting themselves in place), allowing easily and quickly closing the packaging. It shall be further noticed that no operator who constantly controls the station 1 and who locates the fallen bags back to place is needed, since such event is prevented.

**[0034]** Again, the nominal manufacturing rate of the station 1, i.e., the number of packages that may be closed per time unit, can be exactly assessed, allowing a proper dimensioning of the entire case packer and of the entire manufacturing plant.

## Claims

1. A method for closing packages in a case packer, comprising:
  - arranging a first packaging portion (100), containing pillow bags (200), so as to define a base surface (101), two opposite first side walls (102) and two opposite side openings between said first side walls (102);
  - feeding said first packaging portion (100) to a station (1) for closing the packaging;
  - arranging a second packaging portion (103) defining a top part and two opposite second side walls (104) intended to close said opposite side openings;
  - positioning the second packaging portion (103) onto the first packaging portion (100) and folding said two opposite second side walls (104) to close said opposite side openings;
  - at least during the positioning of said second packaging portion (103) onto the first portion, directing a compressed air flow towards the two opposite side openings so as to hold the pillow bags (200) within the first packaging portion (100).
2. The method according to claim 1, comprising positioning two cross bars (9) near to the opposite openings of the first packaging portion (100) to hold the pillow bags (200) within the first packaging portion (100) before positioning the second packaging portion (103) onto the first packaging portion (100).
3. The method according to claim 2, comprising moving said cross bars (9) away from the packaging being formed during the folding of said second side walls (104) onto the first packaging portion (100).
4. The method according to any of the preceding claims, wherein said compressed air flow is dispensed at a pressure ranging between 2 bars and 8 bars, preferably about 4 bars.
5. The method according to any of the preceding claims, wherein said compressed air flow is dispensed at a distance from said bags ranging between 1 and 20 cm, preferably about 10 cm.
6. The method according to claim 2, wherein said compressed air flow is dispensed by diffusing nozzles (8) located on each of said cross bars (9)
7. A package closing station of a case packer, comprising:
  - a transport line (2) arranged to support and transport first portions (100) of packages being formed containing pillow bags (200) and open at least at two opposite side walls (102);
  - supplying members (4) of a semi-finished piece (103), defining a second packaging portion, active on said transport line (2) between an active condition, in which they locate said semi-finished piece (103) on said first packaging portion (100) and close said opposite side openings of the first packaging portion (100), and a waiting position in which they hold said semi-finished piece (103) away from said first packaging portion (100);
  - a pair of cross bars (9) active on said transport line (2) and movable between a containment condition, in which they approach said transport line (2) so as to position themselves at the open side walls of the first packaging portion (100), and a moved-away position, in which they move away from said transport line (2);
  - pneumatic members (7) active on said transport line (2), switchable between an active condition in which they direct a compressed air flow towards said transport line (2) so as to hit said pillow bags (200) at said open side walls, and an inactive condition;
  - said pair of cross bars (9) being arranged to pass from the containment condition to the moved-away condition when the supplying members (4) are switched to the active condition, so that said cross bars (9) do not interfere with said semi-finished piece;
  - said pneumatic members (7) being arranged to be switched to the active condition at least when the supplying members (4) are switched to the active condition.
8. The closing station according to claim 7, wherein said supplying members (4) comprise actuators (6) arranged to fold said semi-finished piece (103) along pre-weakening lines to obtain opposite second side walls (104); said actuators (6) being active in the active condition of the supplying members (4).
9. The closing station according to claim 7 or 8, wherein said pneumatic members (7) comprise at least a diffusing nozzle (8) located in the proximity of said transport line (2); said diffusing nozzle (8) being configured to direct a compressed air flow along a direction substantially perpendicular to said transport line (2).
10. The closing station according to claim 7, wherein said pneumatic members (7) are at least partially integral to said cross bars (9) so as to move therewith.
11. The closing station according to any of the preceding claims, comprising at least one pushing plate (10)

active at said transport line (2) to push an edge (105) of the first packaging portion against the second side walls of the second packaging portion (103).

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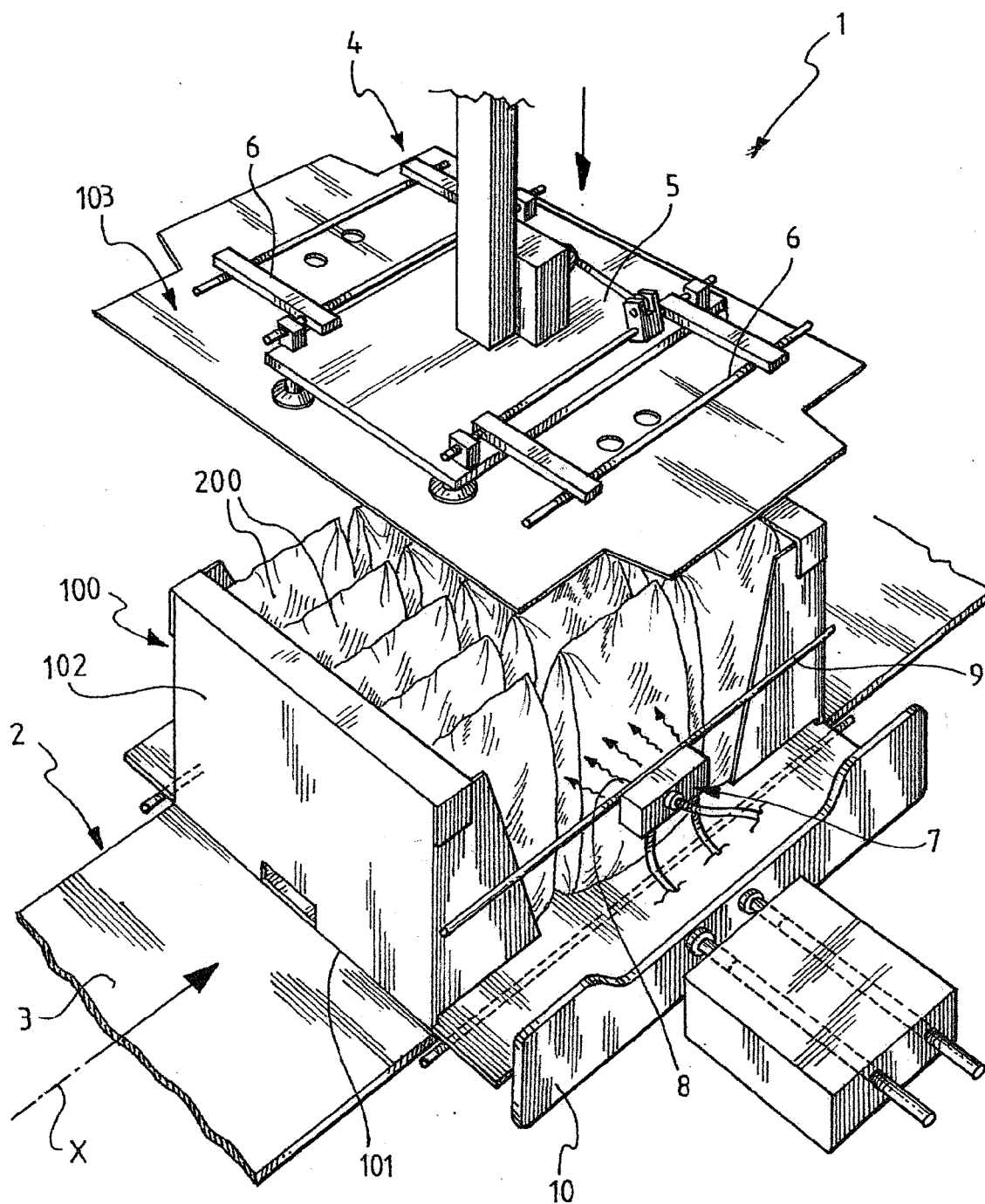
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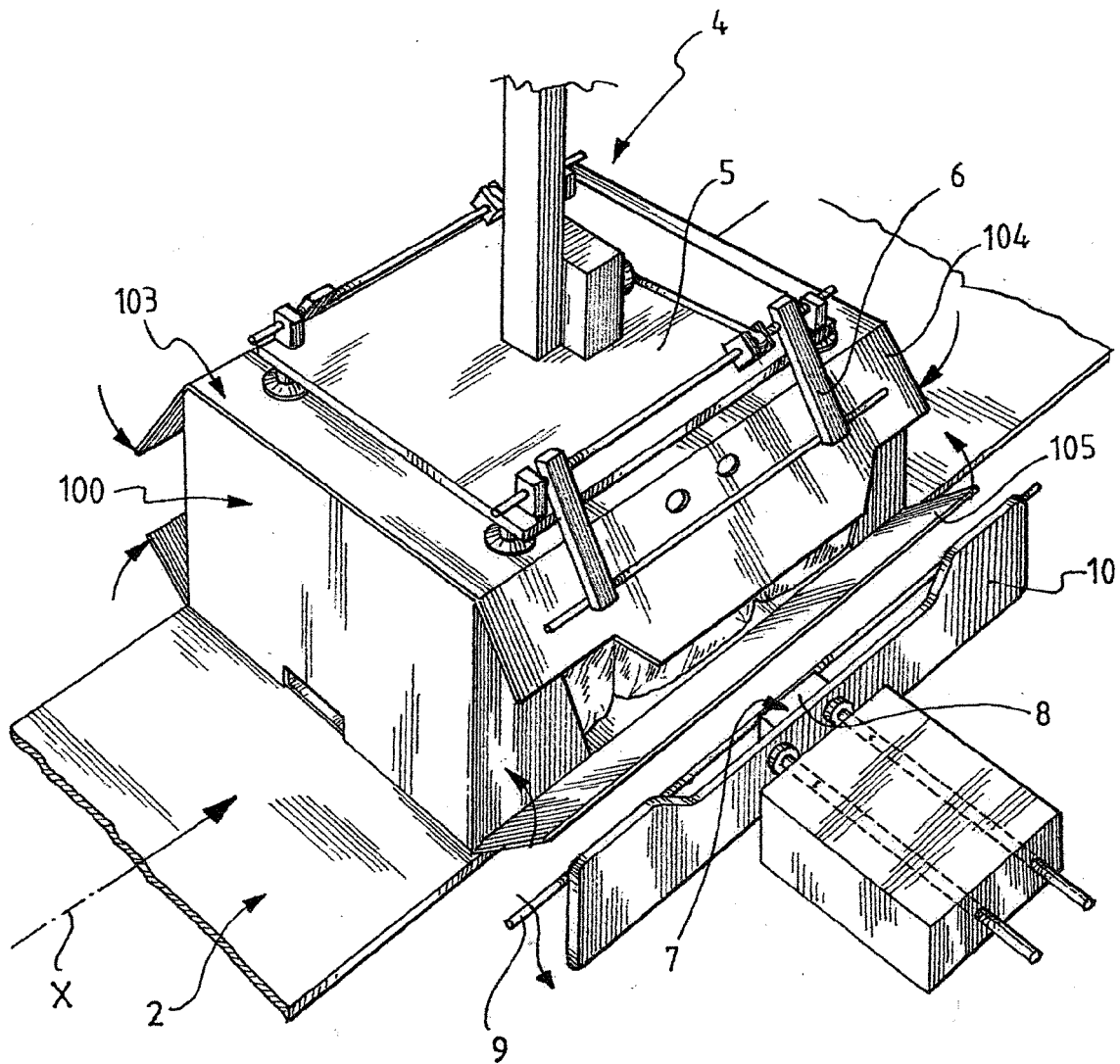
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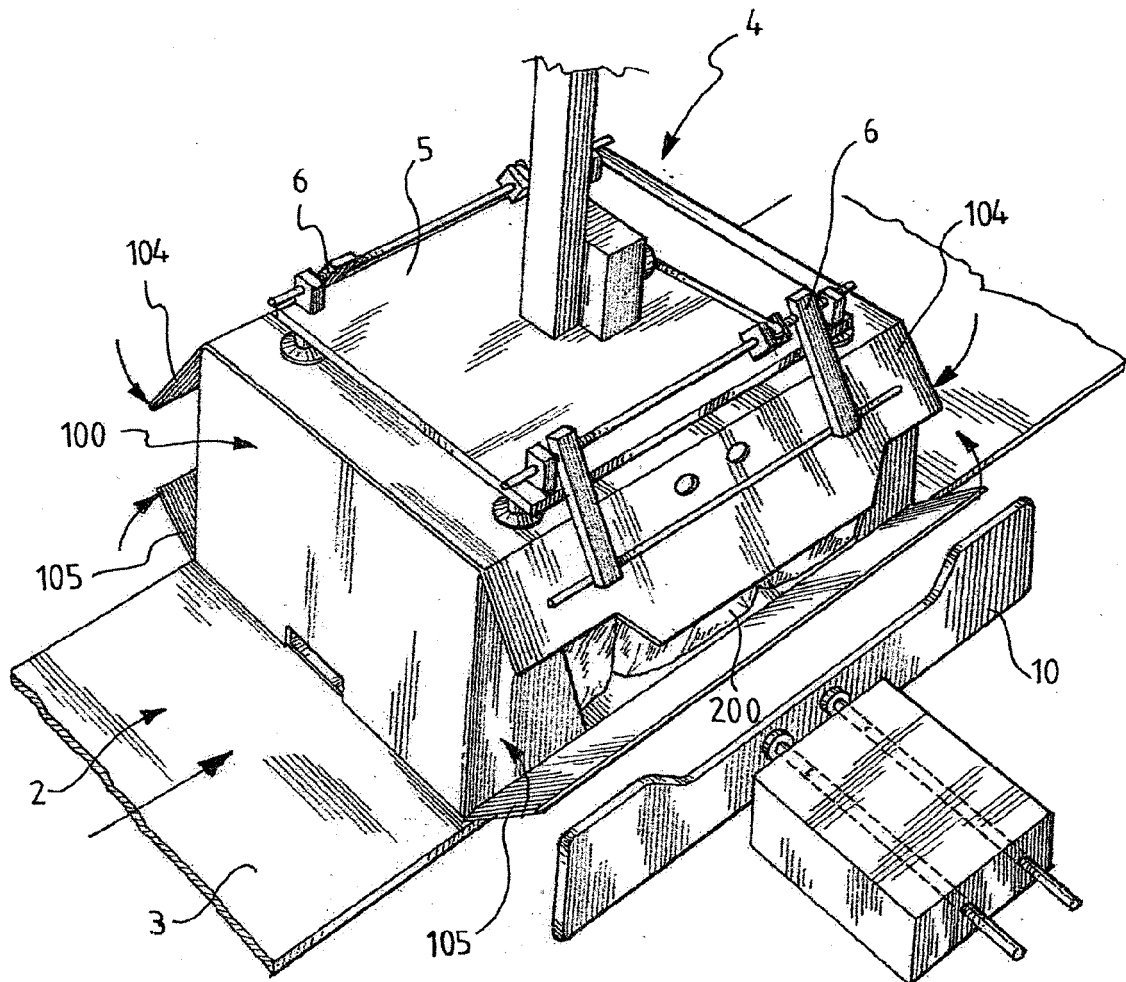
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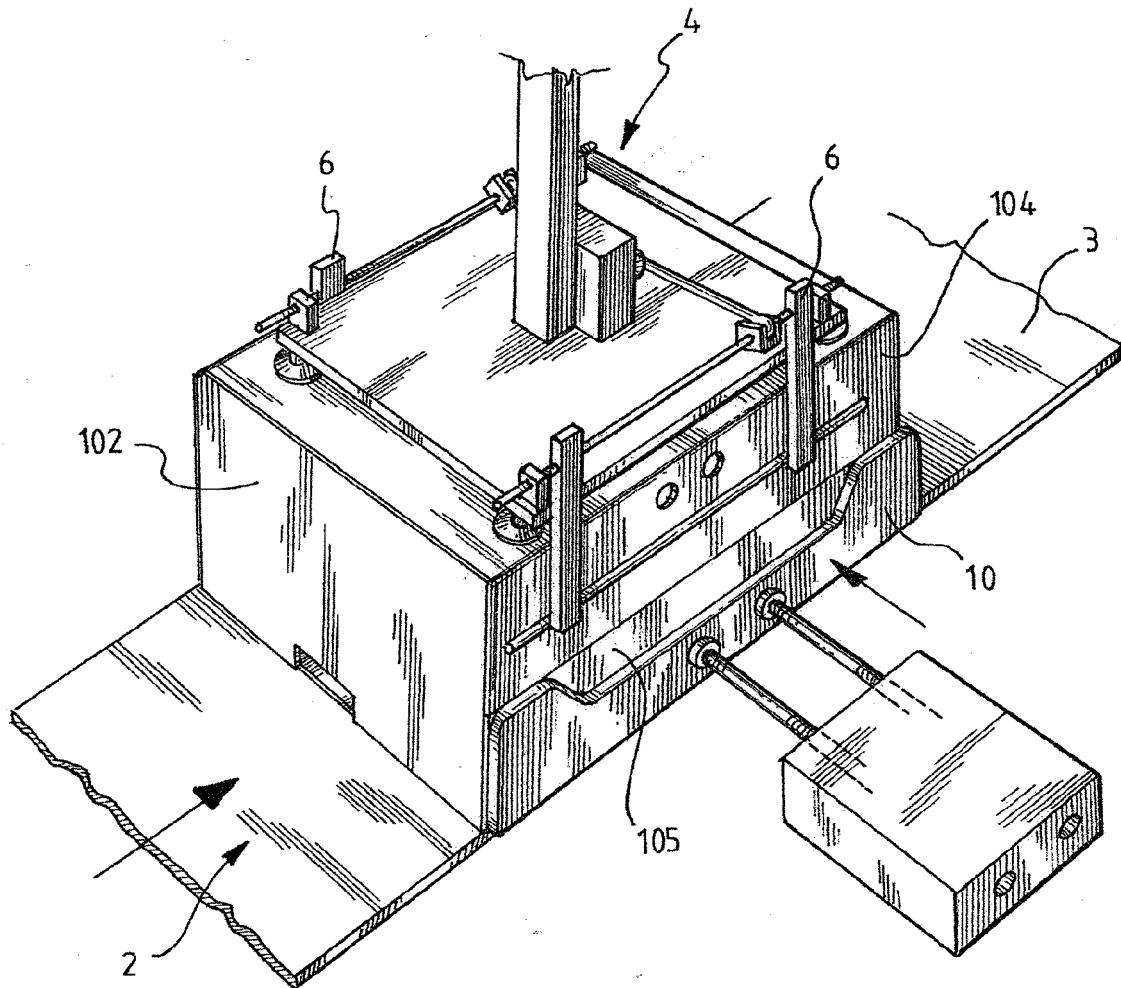
**Fig. 1**



**Fig.2**



**Fig.3**



**Fig.4**



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Application Number  
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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                     |                                                                                                      |                                                                                                                                                                                                                                                                                       |                                         |
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|                                                                                                                                                                                                                         |                                                                                                      |                                                                                                                                                                                                                                                                                       | B65B                                    |
| The present search report has been drawn up for all claims                                                                                                                                                              |                                                                                                      |                                                                                                                                                                                                                                                                                       |                                         |
| Place of search<br><b>Munich</b>                                                                                                                                                                                        |                                                                                                      | Date of completion of the search<br><b>9 February 2015</b>                                                                                                                                                                                                                            | Examiner<br><b>Lawder, M</b>            |
| CATEGORY OF CITED DOCUMENTS                                                                                                                                                                                             |                                                                                                      | T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>.....<br>& : member of the same patent family, corresponding document |                                         |
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