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(54) Title: METHOD FOR THE PRODUCTION OF THE FILM TUBE BAG AND THE VERTICAL FORM FILL SEAL PACKAGING MACHINE TO IMPLEMENT THE METHOD

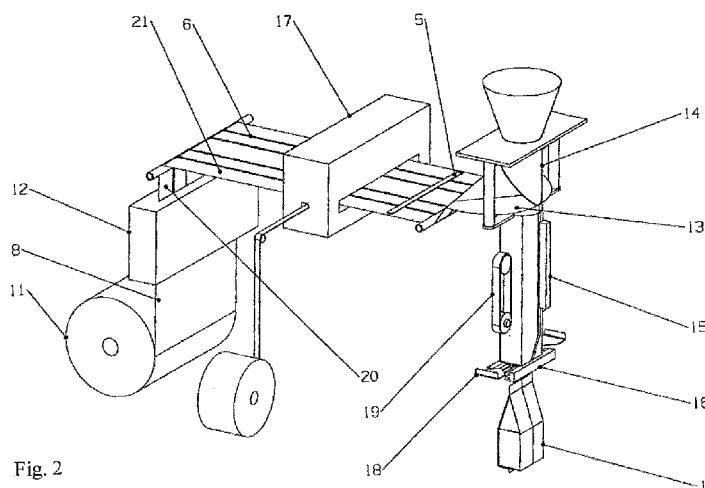


Fig. 2

(57) Abstract: The method of the film tube bag production comprises the following operations: - Shaping the longitudinal foldings (6) on the packing film (8), - Attaching the secondary all-round closure (5) on the inner side (21) of the packing film (8). Its longitudinal axis is perpendicular to the longitudinal axis of the longitudinal foldings (6). The length of the secondary all-round closure (5) corresponds to the size of the inside circumference of the bag (1), - Shaping of the packing film (8) into the form of the film tube, - Closing the film tube and creating the folded flat quadrilateral bottom (3), - Filling the bag and forming the upper cross seam (2). The secondary all-round closure (5) can be formed by a one-piece zipper closure, double-sided adhesive tape, or by the spread of a permanent adhesive. The vertical form fill seal packaging machine comprises the device (11) for the packing film (8) unwinding, the device (12) for shaping and fixing longitudinal foldings (6), the device (17) for the application of the one-piece secondary all-round closure (5), forming collar (13), filling tube (14) and the longitudinal sealing jaw (15), the device (19) for the packing film (8) feed, the device (18) for formation of flat bottom (3) of the bag (1), and lateral sealing and separating jaws (16) to form the cross seam (2, 4) and to separate the filled bag (1).



# **Method for the Production of the Film Tube Bag and the Vertical Form Fill Seal Packaging Machine to Implement the Method**

## Technical Field

The proposed invention concerns a method for the production of a film bag, a film bag with a flat bottom, in particular, with longitudinally sealed reinforcing foldings, and the packaging machine intended for the production of this film bag.

## Background Art

Assorted types of film bags have been available, which are used to pack small wares and food as namely spices, sweets, etc. It is a question of a film tube bag with a folded flat quadrilateral bottom and with welded longitudinal foldings, for instance. The bottom comprises a lower cross seam. The bag is equipped with a plastic zipper closure in the upper part of its inner body, said zipper comprising two parts. The zipper closure represents a secondary closure. The primary closure is formed by an upper cross seam and is situated above the secondary closure.

First of all, a user removes the primary closure formed as an upper cross seam to open such a bag. Then, he opens the bag in the way to draw out mutually connected parts of the zipper closure from each other. Thus, the user has a disposal of a round hole to enter the bag at maximum, the space of which results merely from the openable length of the closed zipper closure – the closure has both its parts mutually welded at the ends for the reason of its easier locking, in principle.

The method for production of such a bag is performed so that the packing film is wound up to form a film tube on which the longitudinal foldings are shaped and sealed. Thereafter, the film tube is insulated by the lower cross seam in its bottom part, whereas the folded bottom of the bag is formed simultaneously.

The two-piece zipper closure is applied to the bag in the following way. First of all, both parts of the zipper closure, which are mutually inserted into each other, are welded by its single part

onto the packing film, which shall subsequently be shaped as a film tube with longitudinal foldings that are sealed, thereat. The zipper closure must be placed on the packing film in order to enable its positioning on the resulting bag on the inner surface of the front, or rear side of the bag. Therefore, the zipper closure is shorter a bit than the width of the bag side to which it is applied to, in this case. When closing the bag by the top cross seal the other part of the zipper closure, so far not welded to the packing film, shall partially be welded to the inner surface of the opposite side of the bag, and partially to both side interlayer papers, formed at the bag production.

Substantive disadvantage of this particular favourite, rather a good looking, and a very well standing bag is considered to be a less spacious area of the discharge opening to the bag. This causes a significant problem at smaller bags, in particular.

### Disclosure of the Invention

The method for the film tube bag production is the subject matter of the invention. This method comprises the following operations:

- Shaping and fixing longitudinal foldings on the outer side of the packing film;
- Fixing the secondary closure on the inner side of the packing film. The longitudinal axis of the secondary closure is perpendicular to the longitudinal axis of the longitudinal foldings. The secondary closure is positioned so that it is located under the upper cross seam on the finished bag and the length of the applied secondary closure corresponds to the size of the inside circumference of the bag. It means that the length of the secondary closure reaches its maximum potential. In terms of an optimum case, it is identical to the size of the inside circumference of the bag. The secondary closure with a reasonably shorter length is used to be respected in practice in consideration of necessary manufacturing tolerance. Thus, the beginning and the end of the secondary closure are prevented from overlapping each other in the finished bag, which is unacceptable regarding the requested tightness. A very small incidental spacing between the beginning and the end of the secondary closure is generally not considered a defect;
- Shaping of the packing film with the parallel longitudinal foldings into the form of the film tube;
- Closing the film tube with the longitudinal seam parallel with longitudinal foldings;

- Creating the folded flat quadrilateral bottom with the lower cross seam;
- Filling the bag with the packed goods;
- Creating the upper cross seam on the side of the bag opposite the folded flat quadrilateral bottom;
- Separating the filled bag from the film tube.

The secondary closure is composed of a one-piece zipper closure in the convenient embodiment of the invention, in particular.

The secondary closure can be composed of a double-sided adhesive tape in another convenient embodiment. In that case the side of the adhesive tape glued on the inner side of the bag indicates a higher binding property than the other side. The adhesive layer situated on the side of the strip facing inward of the bag enables to separate the strips repeatedly and connect them again, and thereby the sides of the bag, as well.

The secondary closure is composed of a spread of a permanent adhesive in another convenient embodiment of the invention. That enables to separate the inner sides of the bag repeatedly and connect them again at the point of the secondary closure.

First of all, three longitudinal foldings are formed only in certain cases (e.g. a neater bag appearance, a simplification of one of the production steps). The fourth longitudinal folding is formed by a latterly formed longitudinal seam. It means that three corners of the bag are equipped with longitudinal folding and the fourth corner of the bag with the longitudinal seam. Thanks to this fact, the longitudinal seam does not have to be positioned in a certain (in the rear side, generally) side of the bag.

It is an advantage to apply the vertical form fill seal packaging machine in accordance with the related invention for the afore-mentioned method of the production. The machine comprises (in the direction of the packing film movement) the following: a device for packing film unwinding, which is followed by the device for shaping and fixing longitudinal folding on the packing film. It is followed by a device for an application of the one-piece secondary closure on the packing film with formed longitudinal foldings. Thereinafter, a forming collar, a filling tube as well as a longitudinal sealing jaw to manufacture the longitudinal seam follow. There is a device for the packing film feed leading through the forming collar in the space below the forming collar. Furthermore, it is followed by a device enabling to form the flat bottom of the bag, and lateral sealing and separating jaws to manufacture the cross seam, and to separate the filled bag.

The packing film runs through all mentioned components of the machine where it is gradually processed in the form of a filled film tube bag closed by the primary and secondary closures. A stable bag is elaborated thanks to the previously mentioned production method including advantages manufactured by the described machine, equipped with the secondary closure, which has a disposal of a large opening to access the inwards of the bag. The area of such an opening stems from the circumference of the whole bag and is on order of tens of percentages higher than at the application of a common two-piece zipper closure.

### Brief Description of Drawings

Exemplary implementation of the submitted invention shall be described with reference to drawings where the below mentioned figures show the details of

- Fig. 1            The film tube bag with a flat bottom, secondary closure and longitudinal reinforcing foldings;
- Fig. 2            The layout of the vertical form fill seal packaging machine with the device for an application of the secondary closure.

### Best Mode for Carrying Out the Invention

Exemplary method for the film tube bag 1 production comprises the following sequential consecutive operations:

- Shaping and fixing three longitudinal foldings 6 on the outer side of the packing film 8;
- Attaching the all-round secondary closure 5, which longitudinal axis is perpendicular to the longitudinal axis of longitudinal foldings 6 on the inner side of the packing film 8. The all-round secondary closure 5 is situated in the way that it is placed inside the finished bag below the upper cross seam 2. In this case, the secondary closure 5 is formed by a one-piece zipper closure and the length of the applied secondary all-round closure 5 corresponds with the size of the bag inside circumference;
- Shaping of the packing film 8 together with the parallel longitudinal foldings 6 into the form of the film tube;

- Closing of the film tube with the longitudinal seam 7 parallel with longitudinal foldings 6. In this case, the longitudinal seam 7 is located in one of the corners of the bag 1, and it forms the fourth longitudinal folding 6, simultaneously;
- Forming the folded flat quadrilateral bottom 3 together with the lower cross seam 4;
- Filling the bag 1 with the packed goods;
- Forming the upper cross seam 2 on the side of the bag 1 opposite the folded flat quadrilateral bottom 3,
- Separating the filled bag 1 from the film tube.

The vertical form fill seal packaging machine used for the above described method for the film tube bag production comprises the device 11 for the unwinding the packing film 8 followed by the device 12 for welding longitudinal foldings 6 on the packing film 8. Thereinafter, another device 17 shall be integrated in the machine with the aim to apply a one-piece secondary all-round closure 5 on the packing film 8 with formed longitudinal foldings 6. It is followed by the forming collar 13, filling tube 14 and the longitudinal sealing jaw 15 forming the longitudinal seam 7 and the device 19 for the packing film 8 feed and then the device 18 for forming the flat bottom 3 of the bag 1 as well as the lateral sealing and separating jaws 16 to manufacture the cross seam 2, 4, and to separate the filled bag 1.

Exemplary embodiment shall be depicted in Fig. 1 and Fig. 2.

List of Reference Numbers

- 1 – Bag
- 2 – Upper Seam
- 3 – Bottom
- 4 – Lower Seam
- 5 – Secondary All-round Closure
- 6 – Longitudinal Folding
- 7 – Longitudinal Seam
- 8 – Packing Film
- 11 - Device for Packing Film Unwinding
- 12 - Device for Shaping and Fixing Longitudinal Foldings
- 13 – Forming Collar
- 14 – Filling Tube
- 15 – Longitudinal Sealing Jaw
- 16 – Lateral Sealing and Separating Jaws
- 17 – Device for the Application of One-piece Secondary All-round Closure
- 18 – Device for the Flat Bottom Formation
- 19 – Device for the Packing Film Feed
- 20 – Outer Side of the Packing Film
- 21 – Inner Side of the Packing Film

### Patent Claims

1. The method for the production of the film tube bag comprising the following operations:
  - Shaping and fixing longitudinal foldings (6) on the outer side (20) of the packing film (8),
  - Shaping of the packing film (8) with parallel longitudinal foldings (6) into the form of the film tube,
  - Closing of the film tube by the longitudinal seam (7) parallel with the longitudinal foldings (6),
  - Forming the folded flat quadrilateral bottom (3) with the lower cross seam (4),
  - Filling the bag (1) with the packed goods,
  - Forming the upper cross seam (2) on the side of the bag (1) opposite the folded flat quadrilateral bottom (3),
  - Separating the filled bag (1) from the film tube

**characterized in that**

after shaping and fixing the longitudinal foldings (6), the secondary closure (5) is fixed on the inner side (21) of the packing film (8), which longitudinal axis is perpendicular to the longitudinal axis of the longitudinal foldings (6) prior to shaping the packing film (8) into the tube, whereas the secondary closure (5) is positioned so that it is located on the finished bag below the upper cross seam (2) where the length of the applied secondary all-round closure (5) corresponds to the size of the inside circumference of the bag (1).

2. The method for the production of the film tube bag according to the Claim 1 **characterized in that** the secondary all-round closure (5) is formed of the one-piece zipper closure.
3. The method for the production of the film tube bag according to the Claim 1 **characterized in that** the secondary all-round closure (5) is formed of the double-sided adhesive tape where the side of the tape glued on the inner side of the bag (1) indicates a higher binding property than the other side.



4. The method for the production of the film tube bag according to the Claim 1 **characterized in that** the secondary all-round closure (5) is formed by the spread of a permanent adhesive.
5. The method for the production of the film tube bag according to any of the preceding claims **characterized in that** the three longitudinal foldings (6) are formed primarily, and the fourth longitudinal folding (6) is formed by the longitudinal seam (7) formed afterwards.
6. The vertical form fill seal packaging machine advantageously applicable for the method of the film tube bag production according to the Claims 1 to 5 comprising device (11) for unwinding the packing film (8),  
where there is the device (12) situated behind it for shaping and fixing longitudinal foldings (6) on the packing film (8), forming collar (13), filling tube (14) and the longitudinal sealing jaw (15) applicable to the formation of the longitudinal seam (7), the device (19) for the packing film (8) feed through the forming collar (13), and thereafter the device (18) for the formation of the flat bottom (3) of the bag (1), and the lateral sealing and separating jaws (16) to form the cross seam (2, 4), and applicable to the separation of the filled bag (1) **characterized in that** there is the device (17) for the application of the one-piece secondary all-round closure (5) on the inner side (21) of the packing film (8) with formed longitudinal foldings (6) located within the space between the device (12) for shaping and fixing the longitudinal foldings (6) and the forming collar (13).

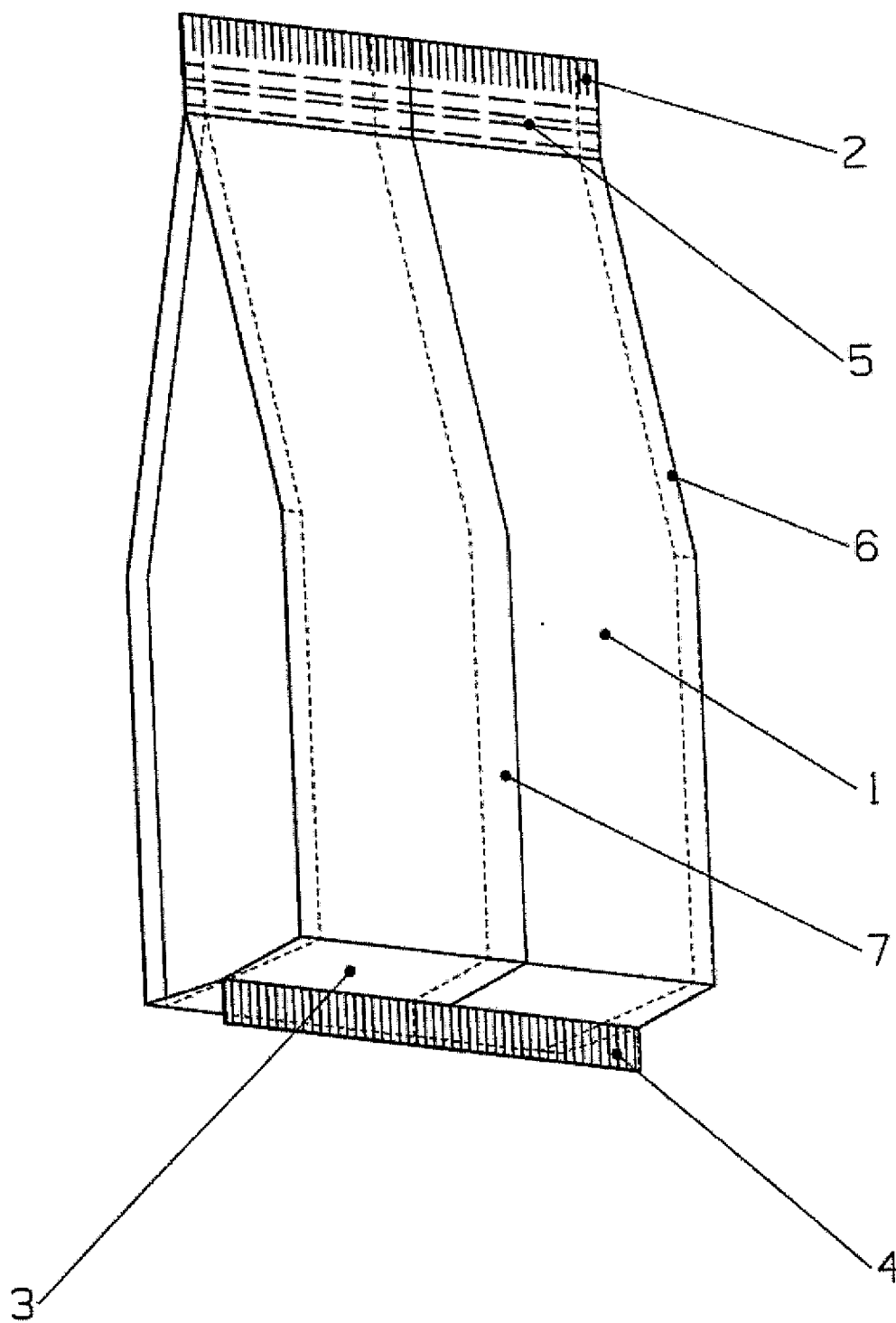


Fig. 1

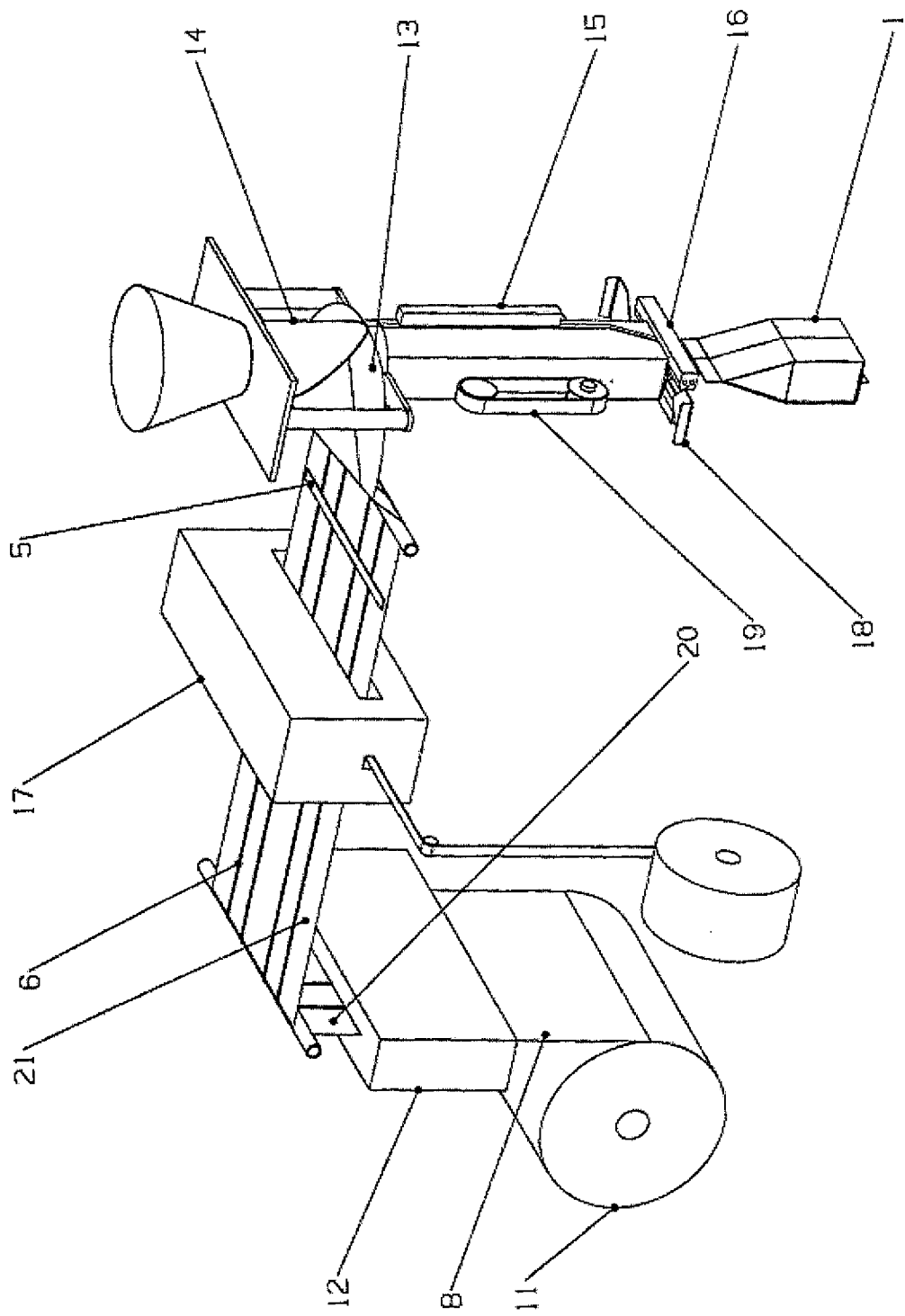


Fig. 2

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/CZ2015/000025

## A. CLASSIFICATION OF SUBJECT MATTER

INV. B65B51/26 B65B61/18 B65B9/20  
ADD.

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)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C.



See patent family annex.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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