US 20130133294A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2013/0133294 A1

(43) Pub. Date: May 30, 2013

Kortschack et al.

(54) METHOD FOR THE PREFERABLY CONTINUOUS PACKAGING OF PRODUCTS

(75) Inventors: **Fritz Kortschack**, Berlin (DE); **Volker Heinz**, Quakenbruck (DE); **Stefan Töpfl**, Osnabruck (DE); **Bernhard Hukelmann**, Quakenbruck (DE); **Herbert Bader**, Nordwalde (DE); **Ralf Niepelt**, Gronau-Epe (DE)

(73) Assignees: **TRITON GMBH**, Berlin (DE); **NORDENIA TECHNOLOGIES GMBH**, Gronau (DE); **DEUTSCHES INSTITUT FÜR LEBENSMITTELTECHNIK E.V.**, Quakenbrueck (DE)

(21) Appl. No.: **13/643,487**

(22) PCT Filed: **Mar. 31, 2011**

(86) PCT No.: **PCT/EP2011/054984**

§ 371 (c)(1),
(2), (4) Date: **Jan. 7, 2013**

(30) **Foreign Application Priority Data**

Apr. 27, 2010 (DE) 10 2010 018 435.7
Sep. 13, 2010 (DE) 10 2010 045 192.4

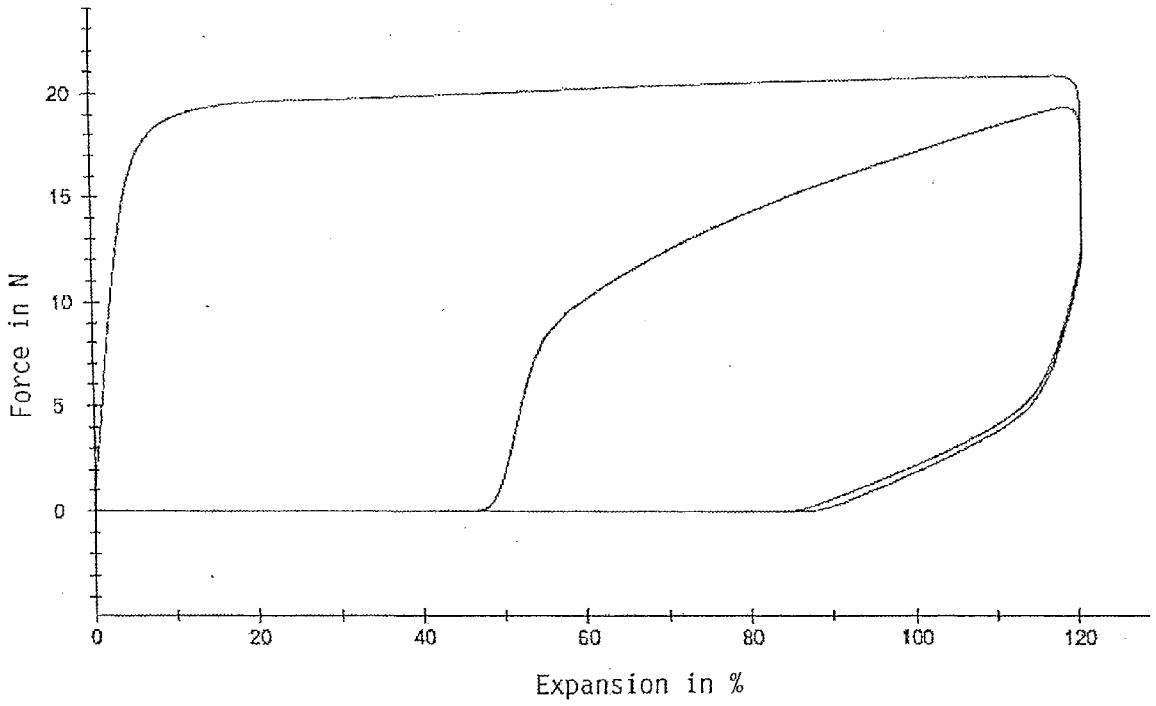
Publication Classification

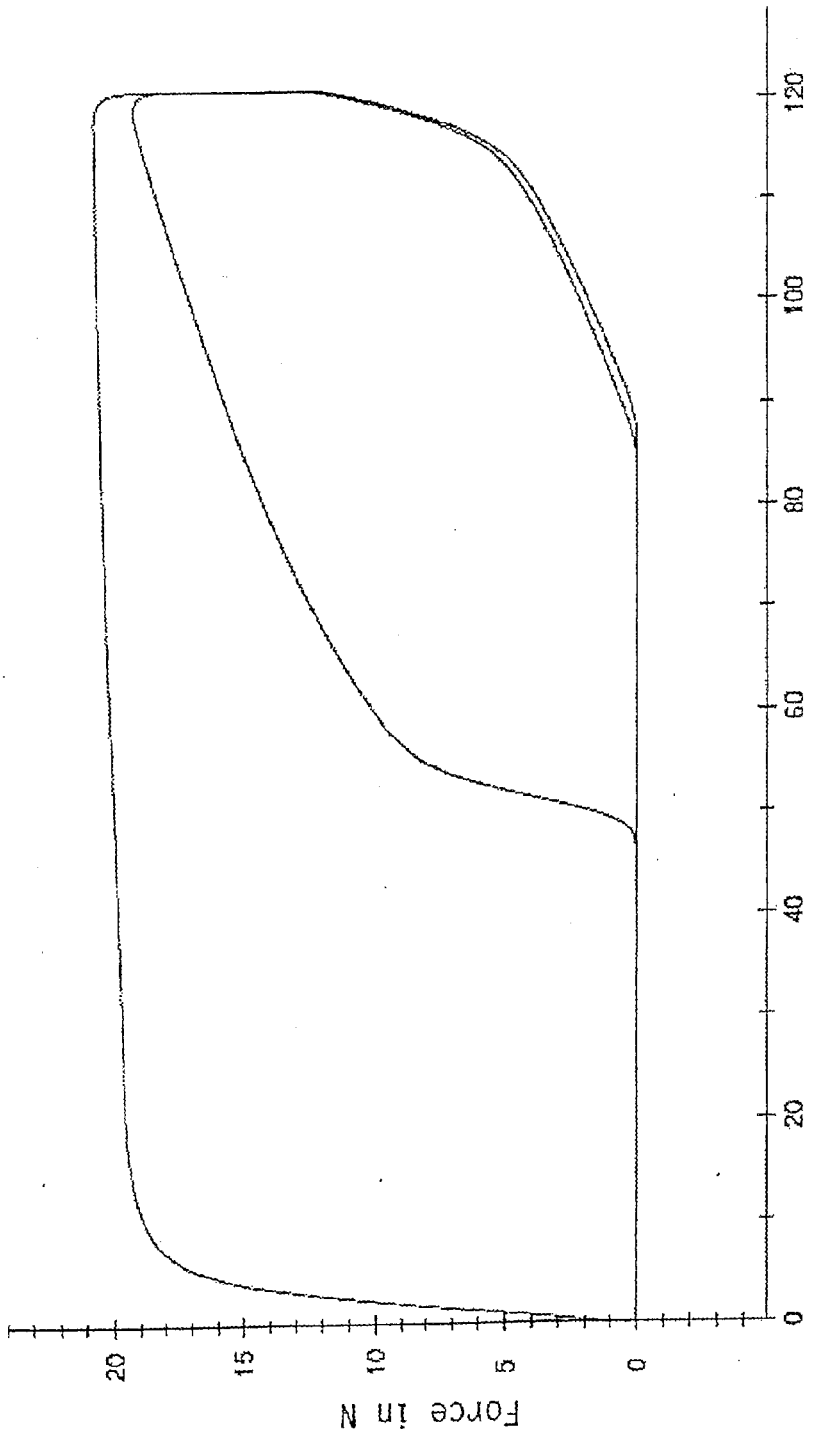
(51) **Int. Cl.**
B65B 11/06 (2006.01)

(52) **U.S. Cl.**
CPC *B65B 11/06* (2013.01)
USPC **53/461**

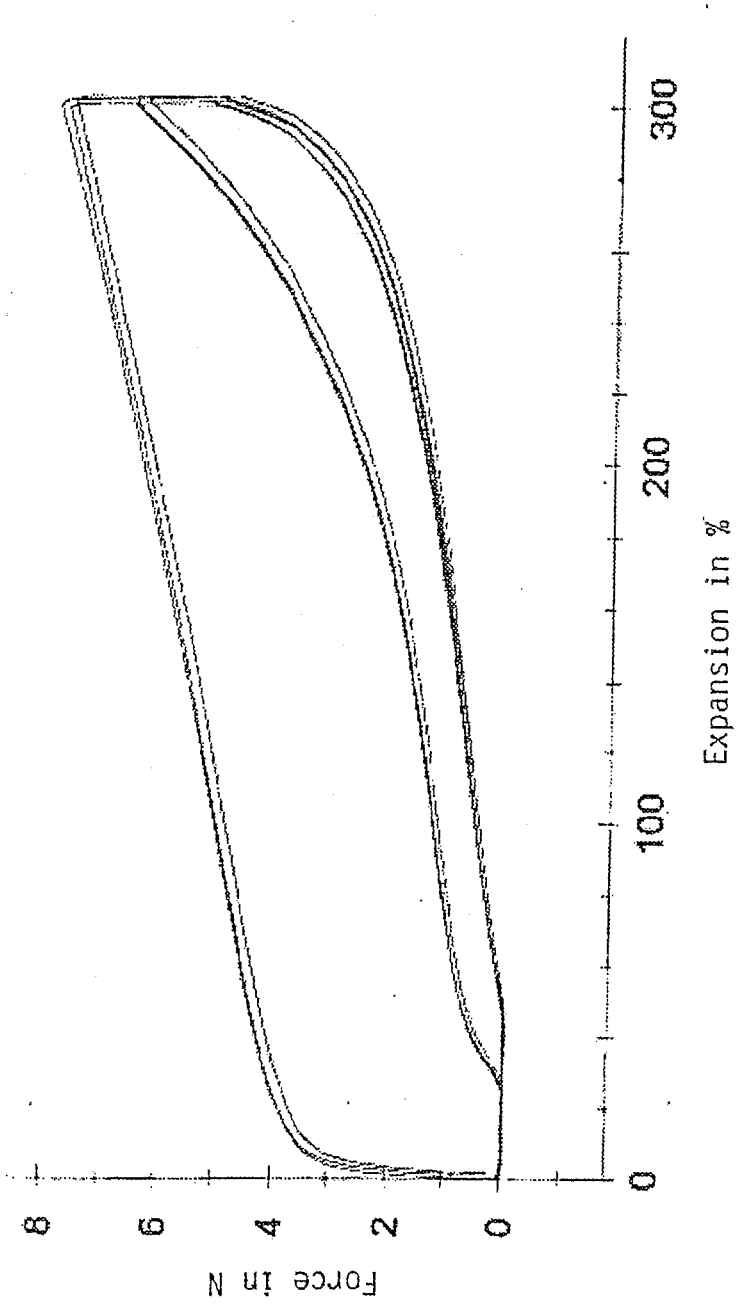
(57) **ABSTRACT**

The invention relates to a method for the preferably continuous packaging of products, in particular foods, with or without an already stabilized inherent shape such as fresh meat, meat products and sausage products, sausage meat emulsion or similar products by encasing them on all sides with single-layer or multilayer films that can be fed from the web. According to the invention flexible films that can be deformed without the action of heating and are self-resetting, are used as bottom web films, wherein the bottom web films are temporarily deformed by the action of pressure in order to form troughs for receiving product. The respective product is introduced as portions into the trough and fixed there, wherein it is fixed by a top web film or covering film, optionally supported by a restrainer. When the action of pressure is released, preferably the bottom web film performs its resetting process and encloses the product thereby at least in part in such a manner that unwanted air inclusions are removed and also a certain product compaction occurs. Then, sealing between top and bottom web films is performed.





PICTURE 1



PICTURE 2

METHOD FOR THE PREFERABLY CONTINUOUS PACKAGING OF PRODUCTS

[0001] The invention relates to a method for the preferably continuous packaging of products, in particular foods with or without an already stabilized natural shape, such as meat products and sausage products, sausage meat or similar products, by encasing them on all sides with a single-layer or multi-layer film which can be fed from a web, according to the preamble of patent claim **1**.

[0002] A method for the surface treatment, simultaneously portioning and shaping as well as preserving foodstuffs, such as meat and sausage products or similar products, is known from WO 2005/099465 A1.

[0003] According to the teaching of this document the product is at first compacted between two shaping, at least partially structured plates. Next, the product is separated into shaped sections by mechanically contacting corresponding portions of the shaping plates. Subsequently, the product is controllably heated, preferably by the shaping plates, in order to form a natural skin on the surface of the product, which has a reduced a_w-value as well as both product shape stabilizing and sterilizing properties. Afterwards, the product is packaged into envelopes, while the enveloping or casing material are simultaneously sterilized by thermal influence.

[0004] A method for the production and shaping of foods, such as meat and sausage products, is known from DE 198 07 794 C2. To protect the foods against recontamination they are enveloped with films prior to the final preservation. According to the method for the continuous production of sausages described in U.S. Pat. No. 6,135,869 upper and lower films are employed, which are subjected to preshaping. The shaping is accomplished by structured rollers.

[0005] In the method for the production of ham products according to DE 198 59 830 A1 a mold open at one side is used, i.e. a mold which is formed of a trough sealed on the end side and open at the top side, and having a rounded bottom. After filling the mold by pressing on injected and kneaded pieces of meat the filled mold is covered with a lid which lies on the filling material and is subjected to a vacuum. After the return to normal pressure conditions the filling material is cooked, and the correspondingly cooked ham product is then removed from the mold.

[0006] Further known are deep-drawing techniques, also using deep-drawing sheets. These sheets are typically formed of several layers. A lower film unwound from a reel is heated and shaped. The shaped packages are then transported further and filled in the filling area. An upper sheet, which is also unwound from a reel, then serves to seal the shaped and filled packages. In the sealing station the package is subjected to a vacuum and, if necessary, replaced by a modified atmosphere. Heat and pressure seal the upper sheet to the lower sheet. After cutting the package in lengthwise and crosswise directions the finished packages are ready for transport.

[0007] The cited methods according to the prior art all have the disadvantage that the shaping of the packages and subsequently filling them can only be done discontinuously, i.e. in cycles, which results in a reduced productivity.

[0008] Moreover, the filling, for instance, of sausage meat into preformed packages has the disadvantage that a complete filling aiming at avoiding air inclusions is time-consuming, again resulting in productivity constraints.

[0009] Based on the foregoing it is, therefore, the object of the invention to provide a further developed method for the preferably continuous packaging of products, in particular foods with or without an already stabilized natural shape, such as meat products and sausage products, sausage meat or similar products, which avoids undesired air inclusions and allows, when used, a high productivity.

[0010] The solution to the object of the invention is achieved by a method according to the teaching of patent claim **1**. The dependent claims define at least useful embodiments and further developments.

[0011] Accordingly, a method is provided for the preferably continuous packaging of products, in particular foods with or without an already stabilized natural shape, such as meat products and sausage products, sausage meat or similar products, by encasing them on all sides with a single-layer or multi-layer film which can be fed from a web.

[0012] According to the invention a flexible film is preferably used as lower film, which is deformable without the influence of heat and is self-restoring, wherein preferably the lower film is temporarily deformed by the influence of pressure so as to form a trough for receiving the product.

[0013] This film is provided, for instance, with a thickness of 20-300 μm, preferably 50-150 μm, wherein the restoring behavior of the film is characterized in that after an expansion by at least 100% a remaining deformation of 60% and less is obtained. Suited raw materials for the production of such a film are found in the groups of the styrene block copolymers, such as styrene-butadiene-styrene copolymer (SBS), styrene-isoprene-styrene block copolymer (SIS), styrene-ethylene-butene copolymer (SEBS), other thermoplastic styrene elastomers (TPE-S), elastic polyolefin copolymer, thermoplastic polyolefin elastomers (TPE-O), thermoplastic polyurethane elastomers (TPE-U), thermoplastic polyamide elastomers (TPE-A), thermoplastic polyester elastomers (TPE-E) or a mixture of these polymers. Such a film may be formed both as monofilm or also as a multi-layer or coextrusion film.

[0014] In useful embodiments not only the restoring properties, but also further properties may be integrated, e.g. barrier properties with respect to gases, vapors or flavors. Suited raw materials are, for instance, polyamides, ethylene vinyl alcohol (EVOH), polyvinyl chloride (PVC), polyvinylidene chloride (PVDC) or comparable substances which, ideally, are incorporated in one layer of the above-described multilayer or coextrusion films. The upper film, too, may have the same or similar film properties, and may also be deformed temporarily.

[0015] The respective product is then introduced, if applicable in portions, into the trough and fixed there, the fixing being accomplished by an upper film or a cover film, if necessary supported by a hold-down device.

[0016] As soon as the pressure influence stops the flexible film then performs its restoring process, thereby enclosing the product at least partially such that undesired air inclusions are removed. Subsequently, a sealing between the upper film and the lower film is performed. In the above explanation it is assumed that at least the lower film has self-restoring properties. Of course, also the upper film, or the lower and the upper film, may have, quasi kinematically reversed, such self-restoring properties.

[0017] The restoration may be supported by applying a vacuum.

[0018] For deaeration purposes the cover film or upper film may be connected to the lower film section-wise in a first step, and completely and tightly in a second step. In one embodiment the upper film and/or the lower film may have a perforation.

[0019] A rinsing and/or filling process with a protective gas may be carried out after or during the deaeration process.

[0020] The pressure influence for the temporary deformation in order to create the trough for receiving the product is preferably realized by generating a negative pressure at the lower side of the lower film. It is also possible, however, to proceed analogously to the above description and/or exclusively obtain a deformation of the upper film.

[0021] The generation of the negative pressure can be supported by a selective pressure gas supply to the side of the film facing the product, so that an improved shaping is realized.

[0022] The rinsing and/or filling process may be accelerated by applying a vacuum in the outer area of the temporarily deformed film.

[0023] According to another embodiment of the invention it is assumed that the product to be packaged is placed on a relatively rigid plate, tray or carrier, and is enveloped by a self-restoring film which is deformable without the influence of heat and which, in this case, is regarded as the upper film. Analogous to the aforementioned sealing of the upper and lower films, the upper film can be connected completely and tightly to the rigid plate, tray or a carrier. The enveloping process can here by optimized by the negative pressure influence. The enveloping process can also be realized in a protective gas atmosphere.

[0024] It can be learned from the foregoing that not necessarily only the lower film is temporarily deformable by the influence of pressure, but that also a deformable, self-restoring upper film or cover film may be employed if a solid or rigid lower film or a so-called tray is used.

[0025] At least one of the films used has suitable means for the direct or indirect electrical heating of the products received in the temporarily deformed film. These means may be external contacts enclosed by the films.

[0026] The possibility of directly or indirectly electrically heating products received in a packaging, casing or similar means can be employed independently of the use of a special self-restoring film as described herein. Thus, it is possible, for instance, to provide metallic caps for heating and pasteurizing cold cuts, which contact the product in question and realize a conduction of a current, and heating, through the product volume. Heating the respective product and material to be treated may also be accomplished by continuous, e.g. strip-type contacts, which are located in the packaging or run along a sealed seam.

[0027] In another embodiment contacts are provided on or in at least one of the films, which are electrically conductive and create a direct electrical contact to the product so as to realize the desired heating. Providing fixed contacts for the selective heating or for pasteurization on an electrical basis, too, is encompassed by the invention.

[0028] The products respectively located in the deformed film may be resistance-heated and/or high-frequency-heated, wherein the step of heating can be carried out both immediately after the packaging and before the later product removal, i.e. by the consumer. Due to the fact that the packaging is already formed of a flexible film an expansion of the product when heated prior to use or consumption is unproblematic.

[0029] A support mold may be used during the thermal treatment.

[0030] The temporary deformation for the formation of troughs is realized by vacuum molds that move along with the lower film tape.

[0031] It is based on the invention to carry out a continuous, active removal of air inclusions by suction from the filled packages immediately before they are sealed or refilled with a protective gas.

[0032] This removal by suction can be realized through the film which is perforated in the sealing area, the films so far only being connected section-wise, but also through suction holes in a cover plate or cover device. The cover device is here adapted to allow the films to slide along the cover device without damaging the film material.

[0033] In order to prevent a distortion of the films as they slide along underneath the aforementioned cover device for the removal by suction, it is possible to fix the film edges of the filled troughs by a circumferentially sucking negative pressure device.

[0034] The invention will be explained in more detail below by means of an embodiment.

[0035] In the method according to the invention a flexible film is used, which has a great elasticity without being influenced by heat and great restoring forces.

[0036] This film material can be deformed, similar to a membrane, by pressure or negative pressure, with the deformation being restored, i.e. canceled, as soon as the acting force stops.

[0037] If a trough was formed in the film material by means of a negative pressure the supplied product is introduced into this trough. As soon as no more negative pressure is applied the film adapts to the material to be packaged, with the material provided in the trough being held in the trough by means of pressure, e.g. by a joined upper film and/or a hold-down device positioned above the upper film.

[0038] Low-weight materials to be packaged, e.g. pasty materials, uncooked or slightly cooked scalded sausage or frying sausage, can be held in the deformed lower film by a cover film. Undesired air inclusions can escape through perforation holes or perforation slots provided, for instance, in the sealing area of the film. To this end, the upper film is initially connected section-wise to the lower film in a first sealing step, whereby not yet all holes in the sealing zone area are finally closed.

[0039] Due to the restoring force of the lower/upper film the filled in material is uniformly distributed in the package, and air inclusions are pressed out.

[0040] According to the exemplary embodiment it is also possible to support the removal of the air inclusions by actively sucking them off through the perforation holes. It is sensible if the vacuum, which originally created the trough for receiving the product to be packaged, is canceled during this step of removing the air inclusions. In a subsequent complete sealing step all holes that are still present will be closed permanently.

[0041] Goods which should be stored in an environment with as little oxygen as possible are prepared prior to the sealing by actively sucking it off and, where appropriate, introducing an oxygen-free filling gas.

[0042] In a modification of the method the removal by suction is purposefully carried out immediately before the sealing process of the upper film and the lower film, i.e. not through the film perforated in the sealing area.

[0043] According to the invention it is also possible to produce packages that comprise a gas blanket used to prolong the keeping quality of the packaged material or also for the design of the package. To this end, a gas is introduced into the package immediately before the sealing, whereby it is useful

to apply a negative pressure to the lower film again while this gas is flowing in. FIGS. **1** and **2** exemplarily show the mechanical behavior resulting from a hysteresis measurement of the preferably used film material.

[0044] Products which are made durable by high pressure or thermal influence may be subjected to a further treatment in the sealed package because the flexible properties of the film allow an expansion or compression, in particular during a high-pressure treatment of the product during the treatment, without causing damage to the film material.

[0045] A thermal treatment of the products can be realized by applying an electric field or supplying a current, for which purpose the films are provided with a conductive coating having corresponding contact areas. Also, it is possible to embed conductive materials in the sealed seam of the package. Provided contacts may also be used at a later time to heat up the package content before the consumption thereof.

[0046] The packaging technique as introduced has the advantage that no clocked processes are necessary, as all work steps are carried out continuously.

[0047] Due to a permanent sealing, vacuum molds moving along in order to produce the troughs for receiving the product and the supply of the upper film the filling with the product to be packaged can quasi be carried out in parallel with the shaping.

[0048] Upon the termination of the packaging process the packages are separated in a manner known per se, where appropriate in connection with labeling or the introduction into a shipping carton or the like.

1. Method for the continuous packaging of foods with or without an already stabilized natural shape, by encasing them on all sides with a single-layer or multi-layer film which can be fed from a web,

characterized in that

flexible films are used as lower film and/or upper film, which are deformable without the influence of heat and are self-restoring, wherein at least one of the films is temporarily deformed by the influence of pressure so as to form a trough for receiving a product, wherein

the respective product is introduced in portions into the trough and fixed there, the fixing being accomplished by the associated upper film or cover film, wherein

as soon as the pressure influence stops the respective film performs its restoring process, thereby enclosing the product at least partially, wherein the product is enclosed in such a way that undesired air inclusions are removed, and sealing between the upper film and the lower film is performed subsequently.

2. Method according to claim **1**,
characterized in that
for deaeration purposes the upper film is connected to the lower film section-wise in a first step, and completely and tightly in a second step.

3. Method according to claim **1**,
characterized in that
a rinsing and/or filling process with a protective gas is carried out after or during the deaeration process.

4. Method according to claim **1**,
characterized in that
the pressure influence is realized by generating a negative pressure at the outer side of the lower film.

5. Method according to claim **4**,
characterized in that
the generation of the negative pressure and thus the shaping is supported by a selective pressure gas supply to the inner side of the film.

6. Method according to claim **3**,
characterized in that
the rinsing and/or filling process is accelerated by applying a vacuum in the area of the temporarily deformed film.

7. Method according to claim **1**,
characterized in that
means for the direct or indirect electrical heating of the products received in the temporarily deformed film are provided on or in one of the films used.

8. Method according to claim **7**,
characterized in that
the products respectively located in the deformed film are resistance-heated and/or high-frequency-heated, wherein the step of heating can be carried out both immediately after the packaging and before the later product removal.

9. Method according to claim **7**,
characterized in that
a support mold is used during the thermal treatment.

10. Method according to claim **1**,
characterized in that
the temporarily deformed film for the formation of troughs is realized by vacuum molds that move along with the film tape.

11. Method according to claim **1**,
characterized in that
the upper film and/or cover film used is made of a flexible material, in particular a material analogous or similar to the lower film.

12. Method according to claim **7**,
characterized in that
the means for heating comprise contacts in the area of the sealed seam.

* * * * *