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(54) **A method and apparatus for packaging in flexible heat-shrinkable packages.**

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Description

This invention relates to a method and an apparatus for packaging articles and products of various description in flexible heat-shrinkable packaging material. This method is specially useful for packaging food products, especially perishable ones.

Known and currently employed are methods and machines for vacuum packaging various products in flexible, heat-shrinkable, bags or containers, the respective machines being provided with suction nozzles for the evacuation of the bags. With some known methods of this type, which require no vacuum chamber for their operation, an operator manually inserts the vacuum suction nozzle into the mouth of a bag or heat-shrinkable container containing a product to be packaged. After complete evacuation of the air in the container, the mouth is sealed tight with a clamp or clip. Then, the sealed bags are temporarily placed in hot water to cause the container material to heat-shrink all around the product.

With alternative prior methods, heat-shrinking is effected in a vacuum chamber rather than by immersion in hot water. In UK Patent No. 1,561,837 filed March 29, 1976 and in Canadian Patent No. 934,718 filed July 22, 1971, both assigned to W. R. Grace & Co., the container whereinto the product to be packaged has been previously placed, is position inside a chamber, the chamber, and hence the container, are evacuated, the mouth of the container is sealed while the chamber is under vacuum, the chamber vacuum level is increased (chamber is evacuated to a greater extent) to cause the container to bulge out, the walls of the bulging container are heated from a heat source within the vacuum chamber, and atmospheric pressure is restored, at a controlled rate, inside the chamber to accomplish heat-shrinking of the wrapper around the product.

The above-mentioned prior methods have several limitations and disadvantages. For example, the former of the prior methods outlined above involves a complex, laborious, and uneconomical step of immersion in boiling water.

The vacuum chamber method is often complicated to implement because all of the main operations are carried out within the chamber, access to which can cause pneumatic seal problems.

Other prior packaging methods provide for the products to be packaged under a protective gas atmosphere (CO_2, N_2 etc.) as disclosed by US Patent No. 3,939,624 filed March 4, 1975 and assigned to CVP Systems, Inc. Such methods involve no heat-shrinking operations, and hence make no use of heat-shrinkable packaging films.

Other prior art packaging methods allow the surface of the packaging bag in a vacuum chamber to be ballooned away from the surface of a product article in the bag, for the purposes of facilitating removal of any entrapped air from around the product. For example, such a system is known in US—A—3,714,754, DE—A—2,404,038, DE—A—3,123,768, and DE—A—2,247,452 (which serves as the basis for the pre-characterising portions of the independent claims of the present application).

It is a primary object of this invention to obviate such prior method drawbacks by providing a method of vacuum packaging with heat-shrinking, which can be readily and effectively implemented.

Another object of the invention is to provide a method whereby the preservation of the packaged product can be improved, with special reference to the instance of perishable products.

A further object of the invention is to provide a method which is highly reliable and simple and enables heat-shrunk vacuum packages to be produced which are free of wrinkles and of the utmost value as regards their aesthetic presentation.

Also an object of this invention is to provide an apparatus of simple design and construction, adapted to implement the inventive method.

One aspect of the present invention provides a method of vacuum packaging in flexible packaging materials wherein a product to be packaged is inserted in a container formed from a heat-shrinkable thermoplastic material leaving an opening for communication to the outside, comprising the steps of: displacing the thermoplastic material of the container away from the product, while injecting an insulating gas under superatmospheric pressure into the container; heating the container by heat application from an external heat source to induce heat shrinking of the container; removing the insulating gas from within the container while still applying the shrinking heat; and thereafter sealing the container; characterised by the fact that the exterior of the container is exposed to ambient pressure throughout the whole process from loading of the bag until closing of the bag; by the fact that the container is caused to balloon away from the contained product exclusively by injection of the thermally insulating gas into the container; in that the removal of the insulating gas from within the container is initiated by the shrinking of the container and completed by the application of vacuum; and in that during the shrinking the superatmospheric pressure within the container is controlled by means of a vent valve to prevent rupture of the container and to prevent too rapid exit of the gas.

A further aspect of the present invention provides an apparatus for vacuum packaging products in containers formed from flexible, heat-shrinkable packaging materials, comprising:— a support for a loaded container; at least one nozzle; means for communicating said at least one nozzle with a source of an insulating gas at superatmospheric pressure; means subjecting said at least one nozzle to vacuum comprising at least one vacuum cut-off valve in communication with said nozzle means; at least one vent valve in communication with said nozzle means a means of clamping a said filled container with an opening in said container in communication with the said nozzle; a means of dry heating said container; and a means of sealing said container tight; characterised in that:— said source of insulating gas is at superatmospheric pressure; in that said vent valve is a pressure control valve which becomes connected to said nozzle during the operation of said dry heating means and is caused to open upon reaching a pre-determined pressure threshold inside said container and then controls the pressure inside said container at a superatmospheric level during shrinking of the container; in that the nozzle becomes connected to vacuum after the pressure in the container has opened the vent valve; and in that the supported container has its exterior exposed to ambient atmosphere and is not in a vacuum chamber.

In order that the present invention may more readily be understood the following description is given, merely by way of example, with reference to the accompanying drawings, in which:—

Figure 1 is a diagrammatic view of an apparatus according to the invention;

Figure 2 is a diagrammatic illustration of the step sequence which characterizes the inventive method; and

Figure 3 is a diagrammatic illustration of a modified embodiment of the inventive apparatus.

Making reference to Figures 1 and 2, the packaging apparatus according to the invention comprises a heat source 1, which can supply heat, for example either by convection or radiation. Preferably, for a heat source, an electric resistance heater combined with a blower will be used.

A product 2 to be packaged is introduced into a container 3 formed of a flexible thermoplastic material of a heat-shrinkable nature either manually or through conventional loading means for such applications, not shown. The container, with the product to be packaged inside it, is positioned at a nozzle 4, it being, for example, fed by a specially provided conveyor, e.g. a belt conveyor. A suitable clamp 5 provides a tight fit of the mouth of the container 3 onto the nozzle 4. The nozzle 4 is in communication through a valve 8, with a suction means such as a vacuum pump (not shown), and is also in communication with a means 7 of injecting a pressurised gas, for example, through a three-way connector, generally indicated at 6. Specially provided valves 8 and 9 control the opening and/or closing of said suction means and injection means. The nozzle 4 also communicates with the outside atmosphere through a third cut-off valve 10 and additional vent valve 12 connected thereto.

A sealing means 11 is arranged either to heat seal the neck or mouth of the container 3 on completion of the packaging operation, or to apply a strap or clip thereon. The sealing means may comprise heated pressure sealing bars, or as an alternative, where the material of the container 3 is of the self-sealing type, a means of sealing by mere heat application. Alternatively, conventional clipping means may be used.

The packaging method of this invention will be next described with reference to Figure 2. With the sequence indicated at A, the container enclosing the product to be packaged is inserted with its mouth over the nozzle 4, and the clamp 5 is tightened around the container mouth to provide a perfect seal between the container and nozzle. Where the insulating gas of the following step is other than air, e.g. nitrogen or CO_2, a pre-evacuation step is carried out at this time. For this purpose, the valve 8 is opened to put the interior of the container 3 into communication with the vacuum pump, the valves 9 and 10 being held closed. As air is removed from the space between the product 2 and container 3, the latter will collapse to contact the surface of the product 2.

On completion of the air removal step, the insulating gas injection sequence, indicated at B, takes place. Where the insulating gas is air, the pre-evacuation step would be omitted, and the cycle would be resumed by directly going to the gas injection step. During this step, with the valves 8 and 10 closed, the valve 9 is opened to admit pressurised gas from the pressure bottle 7 (Fig. 1) through a pressure reducer (14) into the space between the container 3 and product 2. The gas injection step is continued until the walls of the container 3 bulge out and separate completely from the surface of the product 2, to be insulated therefrom by the gas layer.

The gas pressure at this stage will be the least required to fully detach the container walls from the product, and such as to avoid rupture of the walls. Depending on the material used for the container, the pressure level may range, for example, from 200 to 10,000 Pa.

Thereafter, the operative sequence indicated at C in the drawing takes place, wherein heat begins to be applied by means of the heat source 1 and the valves 8 and 9 are closed and the cut-off valve 10 opened. Under the action of the applied heat, the container 3 undergoes a heat-shrinking effect which causes the previously introduced insulating gas to be discharged through the cut-off valve 10 and vent valve 12 whereby the walls of the container 3 collapse down to contact the surface of the product 2. In such conditions, quick heating of the bag walls can be achieved without the heating rate being hindered by the thermal inertia of the product 2 placed inside the container, owing to the provision of the insulating gas between the product and container. Thus, if the product 2 is a chilled or frozen product, separation of the bag walls from the product by the gas provides insulation so the wall can be heated throughout its thickness. Otherwise the chilled product in contact with the bag wall acts as a heat sink.

The exit of gas from the container is initiated by the shrinking and is appropriately controlled through the vent valve 12, which is calibrated for a preset pressure level dependent on the container size, the material of which it is constructed, and its heat-shrinking temperature. Said vent valve 12 can prevent, during the heat shrinking process, both rupture of the container as caused by excess pressure, and a too high rate of gas removal. In fact, if the container is emptied quickly before its walls have reached their heat-shrinking temperature, the result will be an inadequate heat-shrinking.

The heat-shrinking step may be completed, as illustrated by the sequence indicated at D, by continued application of heat and by opening the valve 8 connected to the vacuum suction system, while closing at the same time the cut-off valve 10. Thus, complete removal of the insulating gas is assured along with the desired level of vacuum in the container 3. The sequence D is specially useful where the product being packaged is of a perishable nature.

Finally, the package sealing step, as illustrated by the sequence E, takes place, for example, by heat sealing using the sealing bars 11. During this step, the excess portion of the container walls is cut off and removed from the nozzle after releasing the clamp 5. Heating is continued to completion of the heat-shrinking process also at the mouth area after sealing.

The material useful for the container in the inventive method is any thermoplastic material exhibiting heat-shrinking properties, and possibly heat welding properties. Single layer films may be used such as biaxially oriented, radiation cross-linked, polyethylene films like the films sold by W. R. Grace & Co. as "D-FILM" or as "CRYOVAC D-FILM" (Trademarks of W. R. Grace & Co.) or bi-oriented plastified polyvinylidene chloride, like the one sold by W. R. Grace & Co. "S-FILM" (Trademark of W. R. Grace & Co.). Alternatively, multilayered films are used which have at least one heat-shrinkable layer and additional layers performing the function of a heat welding layer, of a gas barrier, etc., depending on the final use contemplated. For the heat-shrinkable layer, bi-oriented polyvinylidene chloride and copolymers thereof with ethylenically unsaturated monomers, fluorocarbon polymers, and fluorohydrocarbon polymers, may be used.

For the sealing layer, a polyvinyl acetate or EVA (ethylene-vinyl acetate) copolymer may, for example, be used. The packaging material may moreover comprise additional intermediate layers, e.g. of polyvinylidene chloride, nylon, etc.

An example of a multilayer film useful with this invention is an oriented film having layers of irradiated ethylene-vinyl acetate copolymer/vinylidene chloride copolymer/ethylene-vinyl acetate, or a biaxially oriented film having layers of nylon/nylon/irradiated polyethylene.

The container used with this invention may be in the form of a wrapping sheet to be folded up in the process, or may be seamless tubing closed at one end, or may be a preformed bag.

Figure 3 of the drawings shows an alternative embodiment of an apparatus according to this invention, which allows the inventive process to be carried out in a semi-continuous or continuous fashion.

The apparatus comprises a plurality of nozzles, e.g. four, which are mounted pivotally about a vertical centre axis, each of them being communicated to a vacuum pump, an insulating gas blowing means, a cut-off valve, and a vent valve, as described hereinabove. Timers control appropriately the opening and closing sequence of the various control valves to enable each nozzle to complete its processing cycle, as described with reference to Figure 2, in an independent and non-synchronous manner with respect to the other nozzles. Each nozzle performs a complete processing cycle during its full revolution about the vertical axis, so that upon returning to its starting point, or station A, a nozzle is ready to receive a fresh container with a product to be packaged therein and to complete a further revolution to go through all of the processing sequences B—C—D—E, the finished package being discharged at the point illustrated as station E. The heating and heat-shrinking step is expediently effected by passing the rotating nozzles through a heat tunnel, preferably a convective hot air tunnel but radiation may also be employed, as indicated at 13. To ensure a uniform heat application and rapid transfer of heat, electric resistors and blowers may, for example, be provided inside the tunnel, and arranged evenly across the side and top walls of the tunnel.

As an example, to implement this embodiment of the method and apparatus according to the invention, an existing multistation apparatus may be used, such as the "Girovac" (Trademark of W. R. Grace & Co.) machine from W. R. Grace & Co. or "Roto-Matic" machine from Tipper-Tie Division of Rheem Manufacturing Company, but equipped additionally with all the necessary facilities mentioned above, i.e., a hot air tunnel, heat welding bars and, for each nozzle, a cut-off valve and vent valve.

The invention will be now illustrated by the following example, given herein by way of illustration and not limitation thereof.

Example 1

For a container, a bag is used of a biaxially oriented heat-shrinkable material, of the type available commercially under the trademark "Barrier Bag" and being distributed by W. R. Grace & Co. Said material comprises an outer surface layer of irradiated ethylene-vinyl acetate copolymer, an intermediate, gas impervious layer of plastified vinylidene chloride copolymer, and an inner surface layer of heat sealable ethylene-vinyl acetate copolymer. A product is introduced into the container. In this specific case, a cut of cooked ham is packaged. Next, by means of a sealing clamp, the bag mouth is inserted over a nozzle of a multistation machine, as shown in Figure 3. During the step A, the container with the product therein is secured and sealed to the nozzle. The product being packaged is conveyed over a surface provided with rotating rollers, while through the nozzle, during the step B, air at a pressure of 1.96 KPa is introduced. This pressure can be controlled accurately, for example, with a manostat which automatically closes the gas intake valve upon reaching a preset level.

During the step, the cut-off vent valve is closed. The ham cut being packaged is then started along a hot air heating tunnel 13 which has sufficient length to provide perfect heat shrinkage. Heating is accomplished by means of an electric resistance device incorporating a fan, such as "Leister Forte S" unit or similar unit of 10,000 watts. The tunnel interior temperature is about 170°C. A residence time in the tunnel of 4—5 seconds is adequate to provide full heat shrinkage.

During this step, the cut-off valve 10 is opened. The outflow of the gas contained in the container is appropriately controlled by the vent valve 12, which includes a calibration spring arrangement effective to prevent rupture of the container as well as too fast a removal of the air. At the tunnel end, the vent valve opens fully to allow out all of the contained air. For application in many practical cases, and with special reference to delicate materials, the cycle may be terminated at this point by closing the container with a clip or by heat sealing. Where, on the contrary, heat-shrinking is less than perfect, at the tunnel end, a gas removal step may be provided through the vacuum forced suction system. This additional step is particularly suitable for stronger products where the shrink forces in the wrapping material will not distort the product.

It may be appreciated from the foregoing that the method disclosed herein affords the achievement of a quick and effective heat shrinkage owing to the absence of contact during the heating and shrinking step between the container material and the product, and, therefore, the absence of heat dissipation to the product. Further, this method is more promising from the standpoint of preservation of the packaged product, owing to the insulating gas introduction step ensuring complete removal of the air from the container. Moreover, the presence of the insulating gas layer during the first heating step allows just slight heating of the product and contributes, in turn, to an improved preservation of the product. With the method according to the invention, a highly improved heat-shrinkage of the bag material is achieved without wrinkles, and with aesthetic appeal, similar to that obtained by employing a complex vacuum chamber as with conventional methods. The method and apparatus described herein are susceptible of many modifications and variations, as the skilled person in the art will readily recognize, without departing from the scope of the invention as herein described and claimed.

The "insulating gas" used in the method of the present invention is a gas, preferably an inert gas, which thermally insulates by expanding the bag and placing the bag out-of-contact with the product, i.e., the gas separates the bag and product so that the product will not chill the bag and keep it from being heated to its shrinkable temperature.

Claims

1. A method of vacuum packaging in flexible packaging materials wherein a product to be packaged is inserted in a container formed from a heat-shrinkable thermoplastic material leaving an opening for communication to the outside, comprising the steps of: displacing the thermoplastic material of the container away from the product, while injecting an insulating gas under superatmospheric pressure into the container; heating the container by heat application from an external heat source to induce heat shrinking of the container; removing the insulating gas from within the container while still applying the shrinking heat; and thereafter sealing the container; characterised by the fact that the exterior of the container is exposed to ambient pressure throughout the whole process from loading of the bag until closing of the bag; by the fact that the container is caused to balloon away from the contained product exclusively by injection of the thermally insulating gas into the container; in that the removal of the insulating gas from within the container is initiated by the shrinking of the container and completed by the application of vacuum; and in that during the shrinking the superatmospheric pressure within the container is controlled by means of a vent valve to prevent rupture of the container and to prevent too rapid exit of the gas.

2. A method according to claim 1, characterised in that said insulating gas is air.

3. A method according to claim 1, characterised in that the insulating gas is either nitrogen or CO_2.

4. A method according to claim 3, characterised by an additional step wherein the air in the container prior to the gas injecting step is evacuated from said container by evacuating said container.

5. A method according to any one of the preceding claims, characterised in that said heating step is effected by either convection or radiation.

6. A method according to any of claims 1 to 5, characterised in that said container comprises a multilayer laminated film having at least one heat-shrinkable outer surface layer and a heat-sealable inner surface layer.

7. A method according to any one of the preceding claims, characterised in that the insulating gas introduced with the container is at a maximum pressure in the range of 200 to 10,000 Pa.

8. An apparatus for vacuum packaging products in containers formed from flexible, heat-shrinkable packaging materials, comprising:— a support for a loaded container (3); at least one nozzle (4); means (9) for communicating said at least one nozzle with a source (7) of an insulating gas at superatmospheric pressure; means subjecting said at least one nozzle to vacuum comprising at least one vacuum cut-off valve (8) in communication with said nozzle means; at least one vent valve (12) in communication with said nozzle means; a means (5) of clamping a said filled container with an opening in said container in communication with the said nozzle (4); a means (1) of dry heating said container; and a

means (11) of sealing said container tight; characterised in that:— said vent valve (12) is a pressure control valve which becomes connected to said nozzle during the operation of said dry heating means (1) and is caused to open upon reaching a pre-determined pressure threshold inside said container (3) and then controls the pressure inside said container at a superatmospheric level during shrinking of the container; in that the nozzle (4) becomes connected to vacuum after the pressure in the container has opened the vent valve (12); and in that the supported container (3) has its exterior exposed to ambient atmosphere and is not in a vacuum chamber.

9. An apparatus according to claim 8, characterised in that said predetermined pressure threshold is adjustable.

10. An apparatus according to claim 9, characterised in that adjustment of the opening pressure for the vent valve (12) is performed through either a spring means or pneumatic means.

11. An apparatus according to any one of claims 8 to 10, characterised by comprising a plurality of said nozzles (4) adapted for rotation about a vertical centre axis, each said nozzle being arranged to perform said vacuum packaging in accordance with independent and non-synchronous cycles with respect to the other of said nozzles, each cycle being performed during a complete revolution of each said nozzle.

Patentansprüche

1. Verfahren zum Vakuumverpacken in flexible Verpackungsmaterialien, wobei ein zu verpackendes Produkt in einen Behälter eingebracht wird, der aus einem warmschrumpfbaren, thermoplastischen Material gebildet ist und eine Öffnung zur Kommunikation mit dem Äußeren freiläßt, mit den Schritten: Verlagern des thermoplastischen Materials des Behälters von dem Produkt weg, während ein Isoliergas unter Überdruck in den Behälter eingeleitet wird; Erwärmen des Behälters durch Wärmeaufwendung von einer externen Wärmequelle, um ein Warmschrumpfen des Behälter zu bewirken; Entfernen des Isoliergases aus dem Behälter, während weiterhin Schrumpfwärme zugeführt wird; und danach Verschließen des Behälters; dadurch gekennzeichnet, daß das Äußere des Behälters während des gesamten Vorganges vom Beladen des Beutels bis zum Verschließen des Beutels Umgebungsdruck ausgesetzt wird; daß sich der Behälter von dem darin enthaltenen Produkt ausschließlich durch Einleiten von wärmeisolierendem Gas wegwölbt; daß das Entfernen des Isoliergases aus dem Behälter durch das Schrumpfen des Behälters ausgelöst und durch Anwendung eines Vakuums vervollständigt wird; und daß während des Schrumpfens der überatmosphärische Druck in dem Behälter durch ein Ablaßventil gesteuert wird, um ein Zerreißen des Behälters und einen zu schnellen Gasaustritt zu verhindern.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß das Isoliergas Luft ist.

3. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß das Isoliergas entweder Stickstoff oder CO_2 ist.

4. Verfahren nach Anspruch 3, dadurch gekennzeichnet, daß die Luft aus dem Behälter vor dem Einleiten des Gases evakuiert wird.

5. Verfahren nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß das Erwärmen entweder durch Konvektion oder durch Strahlung erfolgt.

6. Verfahren nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß der Behälter eine mehrschichtige Laminatfolie aufweist, die zumindest eine durch Hitze schrumpfende Außenschicht und eine heißsiegelbare Innenschicht aufweist.

7. Verfahren nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß das in den Behälter eingeleitete Isoliergas einen Maximaldruck im Bereich von 200 bis 10 000 Pa hat.

8. Vorrichtung zum Vakuumverpacken von Produkten in Behältern, die aus flexiblen, heißschrumpfbaren Verpackungsmaterialien gebildet sind, enthaltend: — einen Tisch für einen beladenen Behälter (3); mindestens eine Düse (4); Mittel (9) zum Anschließen der mindestens einen Düse an eine Quelle (7) für Isoliergas, das überatmosphärischen Druck hat; Mittel zum Anschließen der mindestens einen Düse an Vakuum mit mindestens einem Vakuumabsperrventil (8), das an die Düse angeschlossen ist; mindestens ein Ablaßventil (12), das an die Düse angeschlossen ist; eine Einrichtung (5) zum Abklemmen des befüllten Behälters, der eine Öffnung aufweist, die an die Düse (4) angeschlossen ist; ein Mittel (1) zur Trockenerhitzung des Behälters; und ein Mittel (11) zum dichten Versiegeln des Behälters; dadurch gekennzeichnet, daß das Ablaßventil (12) ein Drucksteuerventil ist, das an die Düse während des Betriebs des Trockenerhitzungsmittels (1) angeschlossen ist und beim Erreichen einer vorgegebenen Druckschwelle in dem Behälter (3) öffnet und dann den Druck in dem Behälter während des Schrumpfens des Behälters auf einem überatmosphärischen Wert steuert; daß die Düse (4) an Vakuum angeschlossen wird, nachdem der Druck im Behälter das Ablaßventil (12) geöffnet hat; und daß das Äußere des unterstützen Behälters (3) der Umgebungsatmosphäre ausgesetzt wird und sich nicht in einer Vakuumkammer befindet.

9. Vorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß die vorgegebene Druckschwelle einstellbar ist.

10. Vorrichtung nach Anspruch 9, dadurch gekennzeichnet, daß die Einstellung des Öffnungsdruckes für das Ablaßventil (12) entweder durch ein Federmittel oder durch ein Druckluftmittel erfolgt.

11. Vorrichtung nach einem der Ansprüche 8 bis 10, gekennzeichnet durch eine Anzahl von Düsen (4), die zur Drehung um eine senkrechte Mittelachse gestaltet sind, wobei jede Düse angeordnet ist, um eine Vakuumverpacken nach unab-

hängigen und nicht synchronen Zyklen in bezug auf die anderen Düsen durchzuführen, wobei jeder Zyklus während einer vollständigen Umdrehung jeder Düse durchgeführt wird.

Revendications

1. Méthode d'emballage sous vide dans des matériaux souples d'emballage, où un produit à emballer est inséré dans un récipient formé d'une matière thermoplastique thermorétractable, en laissant une ouverture pour la communication vers l'extérieur, comprenant les étapes de: déplacer la matière thermoplastique du récipient au loins du produit, tout en injectant un gaz isolant à la pression superatmosphérique dans le récipient; chauffer le récipient par application de chaleur d'une source externe de chaleur pour induire un thermo-rétrécissement du récipient; enlever le gaz isolant de l'intérieur du récipient tout en appliquant encore la chaleur de rétrécissement; et ensuite sceller le récipient; caractérisée en ce que l'extérieur du récipient est exposé à la pression ambiante pendant tout le procédé du chargement du sac jusqu'à la fermeture du sac; en ce que le récipient est forcé à ballonner au loin du produit contenu, exclusivement par injection du gaz thermiquement isolant dans le récipient; en ce que l'enlèvement du gaz isolant de l'intérieur du récipient est amorcé par le rétrécissement du récipient et est complété par l'application de vide; et en ce que, pendant le rétrécissement, la pression superatmosphérique dans le récipient est contrôlée au moyen d'une vanne d'évent pour empécher la rupture du récipient et empêcher une sortie trop rapide du gaz.

2. Méthode selon la revendication 1, caractérisée en ce que ledit gaz isolant est de l'air.

3. Méthode selon la revendication 1, caractérisée en ce que le gaz isolant est soit de l'azote ou CO_2.

4. Méthode selon la revendication 3, caractérisée par une étape additionnelle, où l'air dans le récipient avant l'étape d'injection du gaz est évacue dudit récipient en évacuant ledit récipient.

5. Méthode selon l'une quelconque des revendications précédentes, caractérisée en ce que ladite étape de chauffage est effectuée par connection ou rayonnement.

6. Méthode selon l'une des revendications 1 à 5, caractérisé en ce que ledit récipient comprend un film multicouche laminé ayant au moins une couche de surface externe thermo-rétractable et une couche de surface interne thermo-scellable.

7. Méthode selon l'une quelconque des revendications précédentes, caractérisée en ce que le gaz isolant introduit dans le récipient est à une pression maximale comprise entre 200 et 10 000 Pa.

8. Dispositif pour l'emballage sous vide de produits dans des récipients formées en matériaux souples et thermo-rétractables d'emballage, comprenant: un support d'un récipient chargé (3); au moins une tubulaire (4); un moyen (9) pour mettre ladite au moins une tubulure en communication avec une source (7) d'un gaz isolant à la pression superatmosphérique; un moyen soumettant ladite au moins une tubulure à un vide, comprenant au moins une soupape de suppression du vide (8) en communication avec ledit moyen formant tubulure; au moins une vanne d'évent (12) en communication avec ledit moyen formant tubulure; un moyen (5) pour bloquer ledit récipient rempli avec une ouverture dans ledit récipient en communication avec ladite tubulure (4); un moyen (1) pour chauffer ledit récipient à sec; et un moyen (11) pour obturer ledit récipient; caractérisé en ce que ladite vanne d'évent (12) est une vanne de contrôle de pression qui se trouve connectée à ladite tubulure pendant le fonctionnement dudit moyen de chauffage à sec (1) et est forcée à s'ouvrir lorsqu'est atteint un seuil prédéterminé de pression à l'intérieur dudit récipient (3) puis contrôle la pression à l'intérieur dudit récipient (3) puis contrôle la pression à l'intérieur dudit récipient à un niveau superatmosphérique pendant la rétrécissement du récipient; en ce que la tubulure (4) se trouve connectée au vide après que la pression dans le récipient a ouvert la vanne d'évent (12); et en ce que le récipient supporté (3) a son extérieur exposé à l'atmosphère ambiante et n'est pas dans une chambre sous vide.

9. Dispositif selon la revendication 8, caractérisé en ce que ledit seuil prédéterminé de pression est réglable.

10. Dispositif selon la revendication 9, caractérisé en ce que l'ajustement de la pression d'ouverture de la vanne d'évent (12) est accompli soit par un moyen formant ressort ou un moyen pneumatique.

11. Dispositif selon l'une des revendications 8 à 10, caractérisé en ce qu'il comprend un certain nombre de tubulures (4) adaptées à une rotation autour d'un axe central vertical, chaque tubulaire étant agencée pour accomplir ledit emballage sous vide, selon des cycles, indépendants et non synchrones par rapport aux autres desdites tubulures, chaque cycle étant accompli pendant une révolution complète de chaque tubulure.

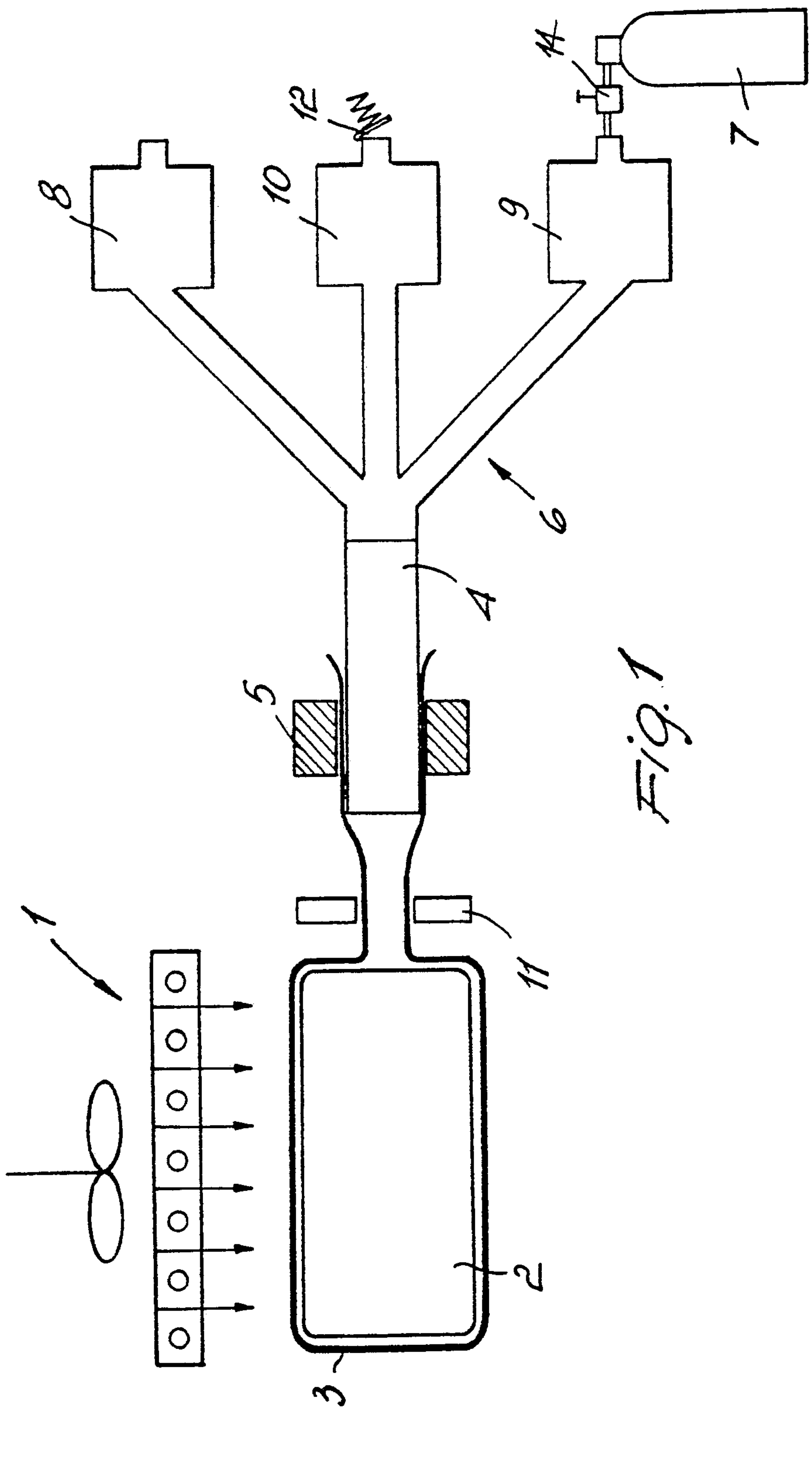

Fig. 1

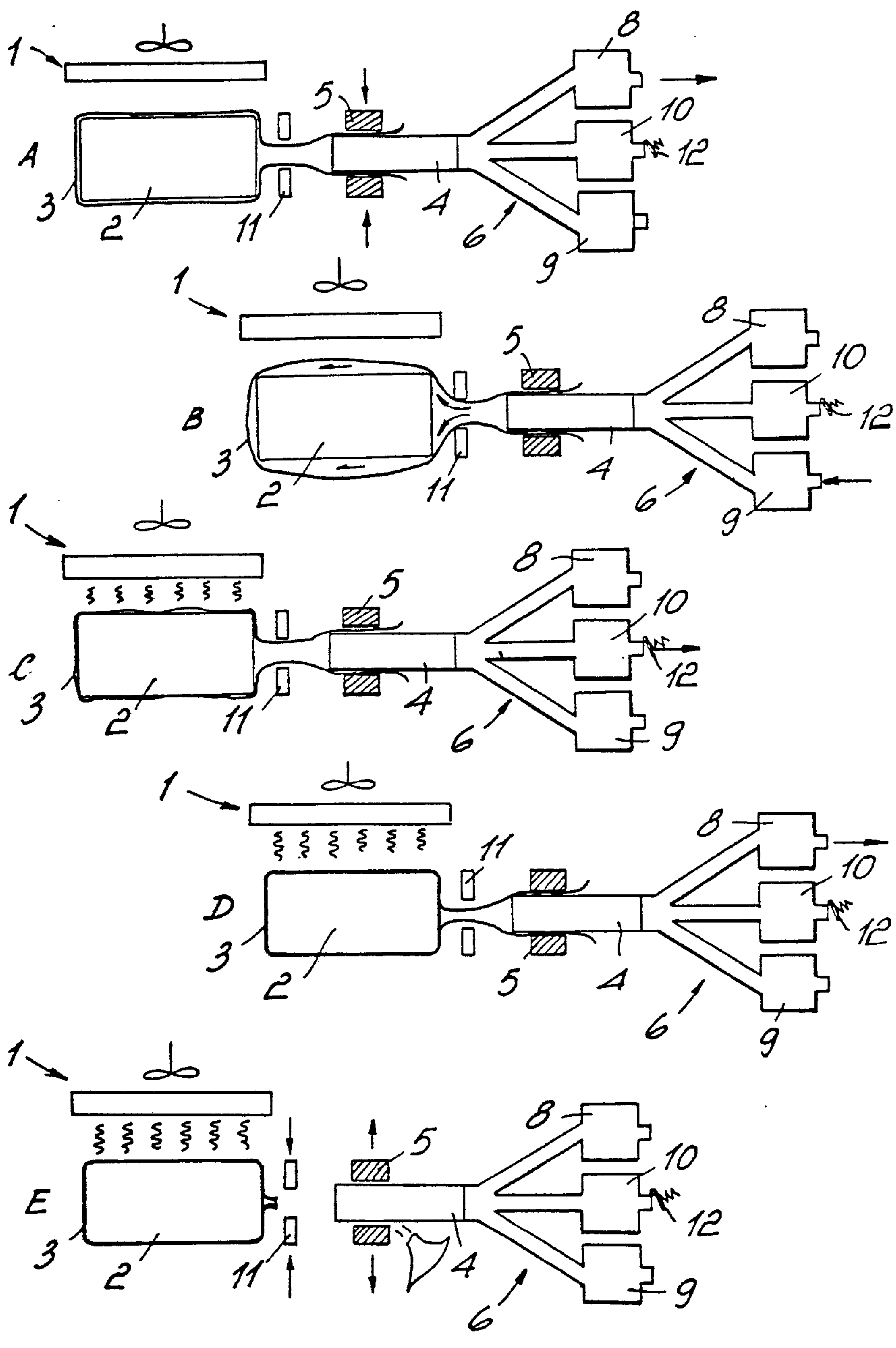

Fig.2

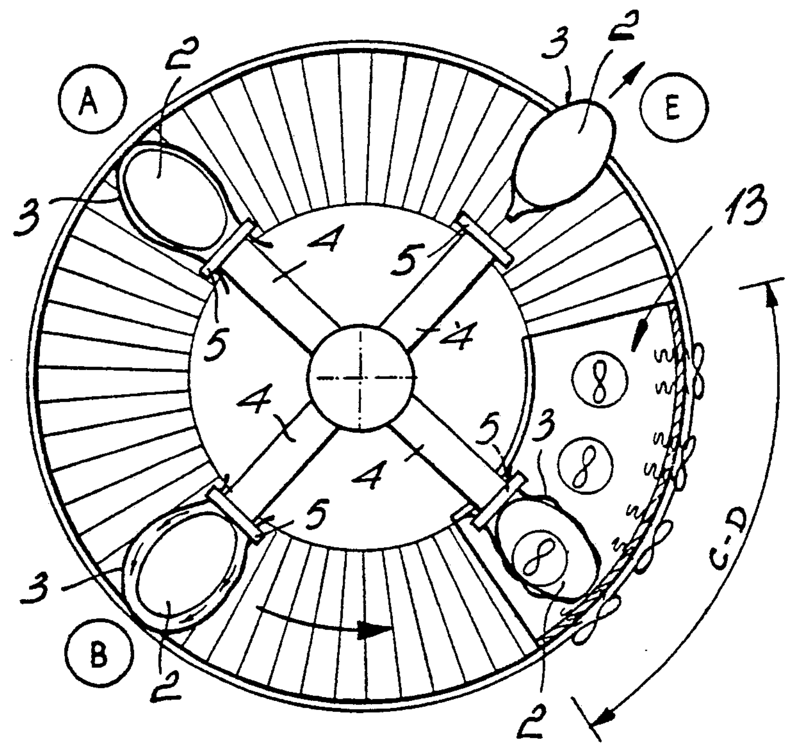

Fig.3