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(54) **ROLLABLE RE-CLOSEABLE PACKAGING AND METHOD FOR PRODUCING SUCH A PACKAGING**

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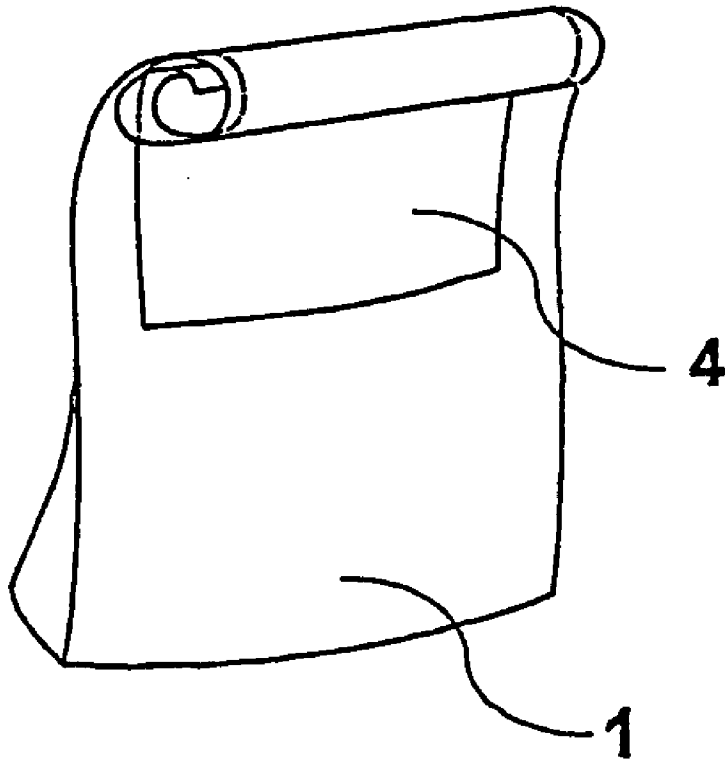
(57) **ABSTRACT**

The invention relates to a package with a roll-up re-sealing system and a process for the production of such a package, especially flexible bags. It was the object of the invention to develop a package of the generic kind described, and also a process for producing it which is suitable for the repeated sealing, storage and repeated removal of liquid, dry, powdery, granular or pelletised contents, such that the package is inexpensive to produce, meets the requirements of protecting the integrity of the product, and is user-friendly, characterised in that a package consists completely or partially of a conditioned multi-layer composite material, or that it at least has an adhesive label made from the conditioned multi-layer composite material on one package wall, beginning in the region of the opening, that the package repeatedly rolls up monoaxially, automatically and in a controlled manner, from the package opening in the direction of the bottom of the package as far as the level of the contents at any particular time and seals itself, and that the process of rolling up and sealing is implemented by the properties of the conditioned multi-layer composite material of the package or the adhesive label.



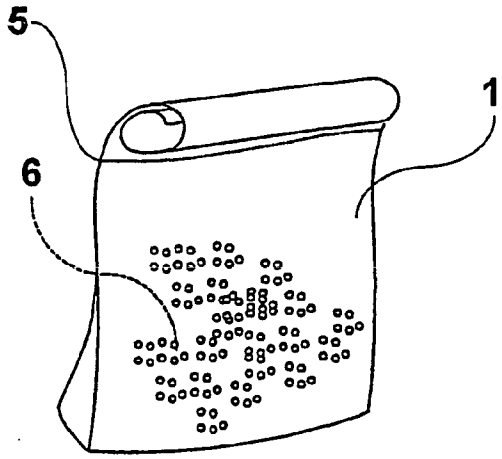


Fig. 1

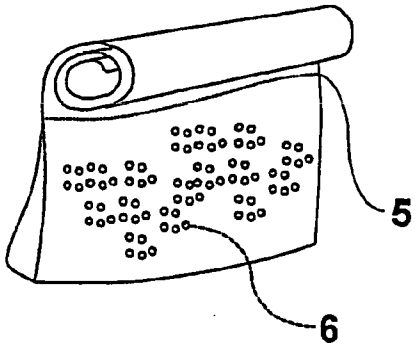


Fig. 2

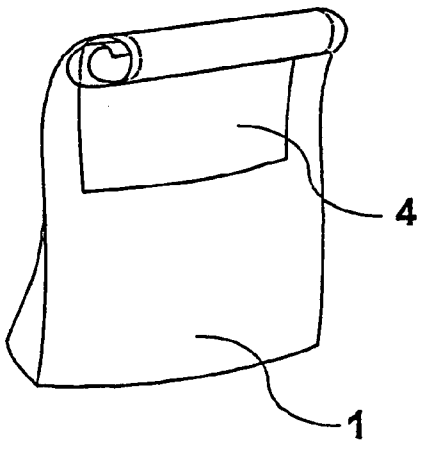


Fig. 3

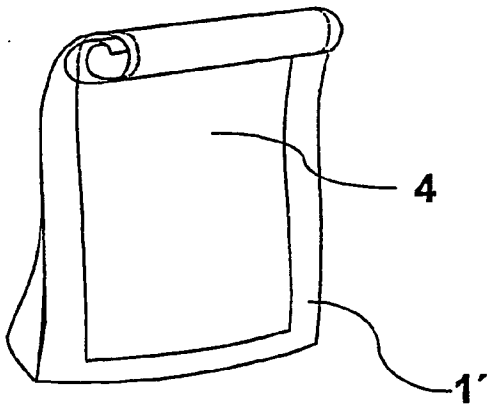


Fig. 4

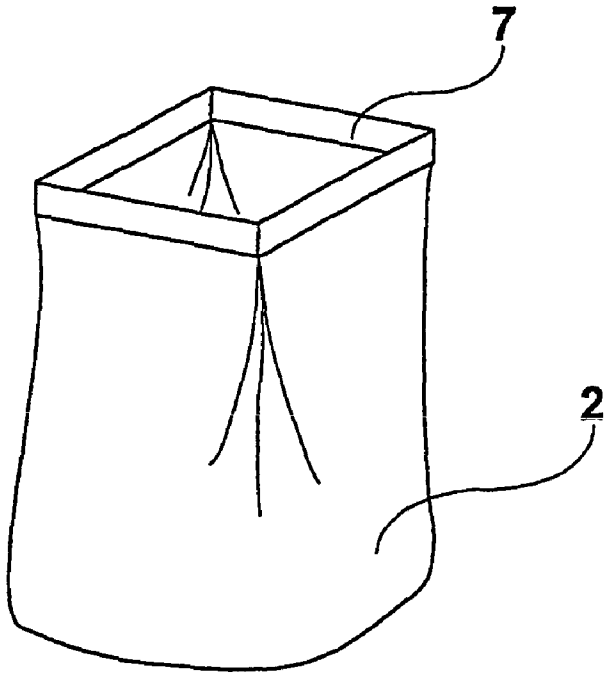


Fig. 5

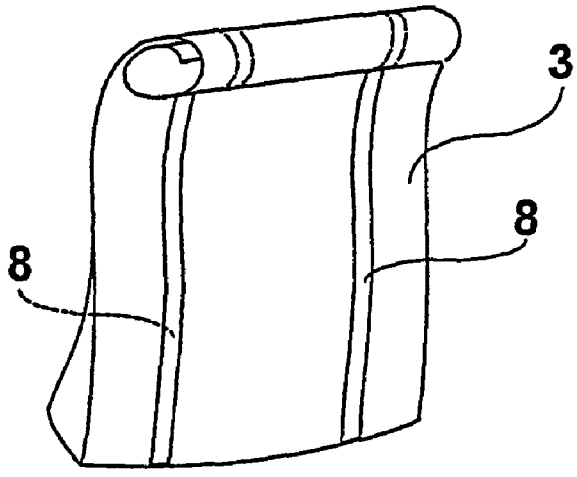


Fig. 6

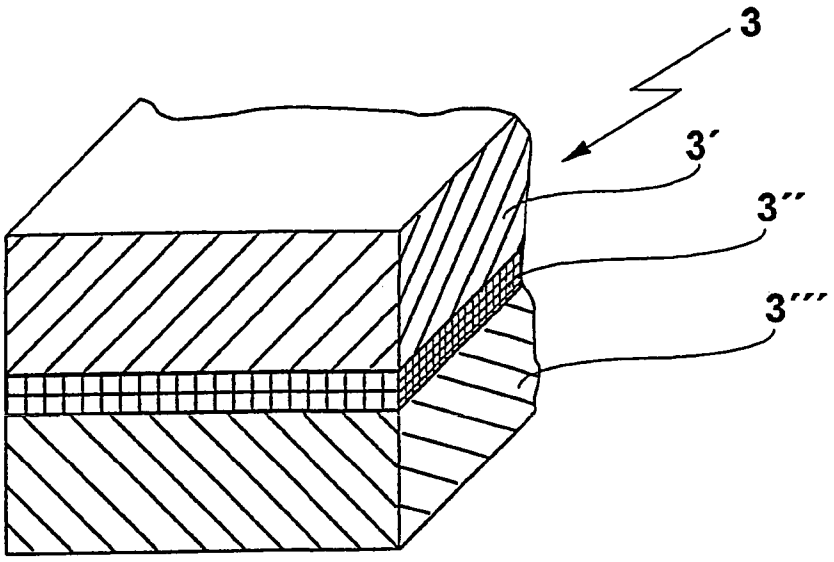


Fig. 7

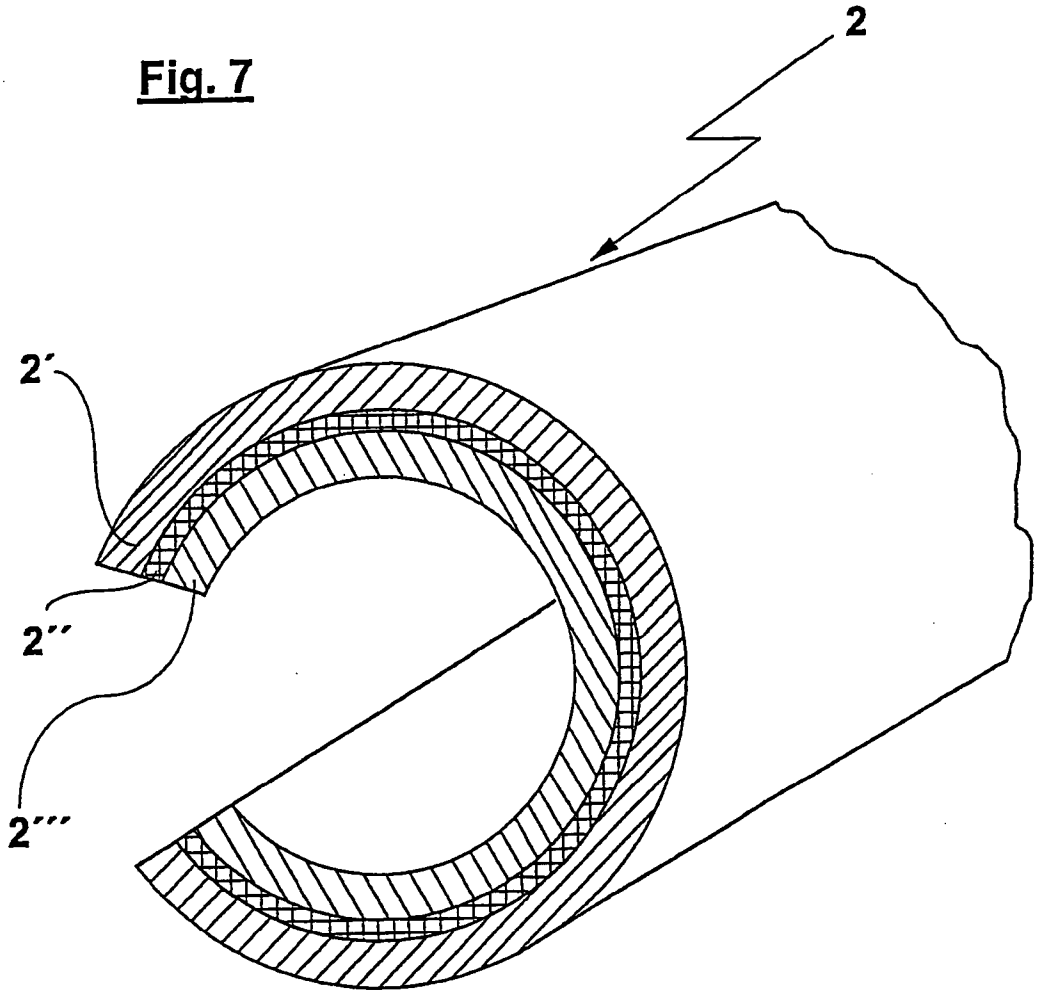


Fig. 8

ROLLABLE RE-CLOSEABLE PACKAGING AND METHOD FOR PRODUCING SUCH A PACKAGING

[0001] The invention relates to a package with a roll-up re-sealing system and a process for the production of such a package, especially flexible bags for the repeated sealing, storage and the repeated removal of liquid, dry, powdery, granular or pelletised contents.

[0002] Known flexible packages are sealed by sealing seams and tear perforations and are offered for sale in this way. In this context, most manufacturers are only interested in protecting the integrity of the product as long as the package remains sealed until the sell-by date is passed. In many packages, no attention is paid as yet to ease of handling and thus consumer-friendliness. It is merely ensured that the product is protected until it reaches the consumer. In most cases, however, a package is not emptied completely. when it is opened for the first time. For these packages, it is a disadvantage that, once the package has been opened, the contents, such as foodstuffs, animal feed and detergents in granular or powder form, can easily trickle out or turn lumpy or be spoiled as a result of environmental influences, such as oxygen and moisture; in the case of foodstuffs, they may even become inedible. The methods conventionally used by consumers to keep a package sealed until the contents are used up completely involve rolling up the opening manually and holding it shut with a rubber band or clip, but these approaches have not been very successful in reducing, let alone overcoming, the disadvantages described above. Packages are also known in the art which are equipped with seals known as zipper strips. These are seals consisting of two extruded plastic sections, one of which is formed as a groove and the one opposite as a tongue, so that they interlock with one another and can be separated again when necessary. They make it possible repeatedly to seal or open packages in the form of flexible bags. When this kind of seal is used, the problem is that the user may not notice the zipper strip when he opens the package for the first time and might perhaps damage it with a pair of scissors or even cut it off completely. In the case of pelletised or powdery contents, there is also a risk that, after the package has been opened and closed a number of times, contents may become embedded in the groove, as a result of which the seal no longer works properly, especially with regard to its tightness, or it may fail completely, or the sealing material may suffer from fatigue, so that no seal at all is possible any longer. A further known method of enabling a flexible package to be resealed is the provision of self-adhesive tabs or straps at the upper end of the bag, which are folded over the package after individual portions of the contents have been removed, thus sealing in the remainder of the contents. Experience has shown that this type of seal likewise involves the risk that contents might stick to the self-adhesive tabs or straps and thus reduce or cancel out the adhesiveness of the seal.

[0003] The patent specification U.S. Pat. No. 3,201,030 also discloses a package with a roll-up re-sealing system. As one variant, the proposed solution provides for the insertion of pre-stressed, resilient aids, such as wires, in the packaging material. The production and disposal of such packages has proven complicated and expensive. A second variant of the solution proposed in that patent specification provides for the use of a composite material with two layers of film with different pre-tensioning, which are laminated on top of one another and are thus intended to create a roll-up effect for a package. This variant of the solution involves the disadvantage that the creation of the roll-up effect takes place in an uncontrolled way and is lost again during the process of shaping, filling and sealing the package, because of the seal. Furthermore, this kind of composite material can only be processed on a highly modified shaping, filling and sealing machine, which results in high investment costs.

[0004] It was therefore the object of the invention to develop a package of the generic kind described, and also a process for producing it which is suitable for the repeated sealing, storage and repeated removal of liquid, dry, powdery, granular or pelletised contents, such that the package is inexpensive to produce, meets the requirements of protecting the integrity of the product in the package, and is user-friendly.

[0005] The solution according to the invention, in accordance with claim 1, therefore proposes a package characterised in that it consists completely or partially of a conditioned multilayer composite material, or that the package consists of any unspecified multi-layer composite material and that there is disposed on one package wall, beginning in the region of the opening, an adhesive label made from the conditioned multi-layer composite material. The advantages of these packages consist in the fact that they can be manufactured from multi-layer composite materials of the kind conventionally used in packaging, such as standard polymers, whose composite layers are arranged by laminating or pasting one on top of the other. The characteristics of the conditioned multi-layer composition cause the package to be rolled up automatically and in a controlled manner from the package opening in the direction of the bottom of the package. The process of rolling up and sealing can be repeated as often as desired. It continues until it reaches the level of the contents and securely seals the package when it is not yet completely empty. In this way, the ease of handling and the service life of the package are increased, the contents can be removed in any quantities desired and at any times desired, and the quality characteristics of the contents, such as their aroma or pourability, are preserved for considerably longer than in conventional packages, since the tightness of the package is ensured. As the package always rolls up as far as the level of the contents, the amount of contents remaining is always visible at the same time. An alternative version of the solution consists in the fact that the process of rolling up and sealing is transferred from an adhesive label made from conditioned multi-layer composite material to the multi-layer composite material of the package, which material may be of any other kind. This variant offers the advantage that the conditioning process may also be carried out outside the shaping, filling and sealing machine, and the adhesive label can be applied to the package, beginning in the region of the opening, after it has been manufactured and filled. The adhesive label can vary in length and width if need be, beginning at the edge of the opening. The process of rolling up and sealing can of course also be transferred to the unspecified multi-layer composite material by tapes or strips of rubber or flat elastomer disposed on at least one wall of the package and applied under a tensioning force. The package, combined with any kind of reinforcement, such as a conventional snap closure, for catching the upper edges of the package opening, simplifies the handling of the package of the invention still further. It should also be

emphasised that the package rolls up completely once it has been finally emptied, which means that it can be disposed of in a space-saving manner.

[0006] Particular emphasis, according to claim 2, should be placed on the properties of the multi-layer composite material which are activated by means of a conditioning process in accordance with claim 5. In at least one layer of the multi-layer composite material, a state of stress must already be generated and frozen in during the film production process. Thanks to the conditioning of the entire surface, or at least part of it, by means of heat-treating the multi-layer film composition produced in this way, the layer of the composition provided with the state of stress expands or contracts monoaxially. This process is transferred by the composition to the multi-layer composite material of the entire package or to partial areas of the package, or by the adhesive label made of conditioned multi-layer composite material to the package, and in this way the roll-up re-sealing system of the invention is created. The fact that these material properties are obtained by means of a conventional conditioning process that has so far been used in order to achieve different technical effects ensures that there is a substantially broader range of possible uses for the packages with the roll-up re-sealing system of the invention. By means of different material thicknesses, which can be defined in production, and/or by giving the layers of the composition different dimensional stabilities, different roll-up diameters and roll-up thicknesses can be implemented in the package as the need arises.

[0007] Another particular advantage is that the process for producing the packages according to claim **5** can be carried out on conventional shaping, filling and sealing machines. Expensive capital expenditure is not necessary. The process permits the use of standard films. The conditioning of the material is likewise possible with these machines. The conditioning of the entire surface, or at least part of it, by means of heat-treating the packaging material can be carried out during or after the process of shaping, filling and sealing the package. This permits great technological variety in the manufacturing process.

[0008] Finally, the process and the package of the invention considerably increases the variety of uses to which the multi-layer film compositions can be put. The roll-up and sealing process of the invention guarantees clean handling of the packages for the consumer. Ineffective makeshift solutions, such as rolling up and holding the package shut with rubber bands or the like, are no longer needed. The package protects the contents for a longer time and increases the storage life of foodstuffs or luxury goods even after the package has been opened.

[0009] The invention is described below with reference to a number of working embodiments exemplified by drawings, in which

[0010] **FIG. 1** shows a perspective front view of a filled package with a conditioned multi-layer composite material as a roll-up re-sealing system,

[0011] **FIG. 2** shows a perspective front view of a half-empty package made from a conditioned multi-layer composite material as a roll-up re-sealing system,

[0012] **FIG. 3** shows a perspective front view of a package made from any unspecified multilayer composite material with a shortened adhesive label made from a conditioned multi-layer composite material as a roll-up re-sealing system,

[0013] **FIG. 4** shows a perspective front view of a package made from any unspecified multilayer composite material with a longer adhesive label made from a conditioned multilayer composite material as a roll-up re-sealing system,

[0014] **FIG. 5** shows a front view of an opened package made from a conditioned multi-layer composite material as a roll-up re-sealing system combined with any reinforcement to catch the opening region,

[0015] **FIG. 6** shows a perspective front view of a package made from any unspecified multilayer composite material with tapes or strips applied under a tensioning force as a rollup re-sealing system,

[0016] **FIG. 7** shows a section through a piece cut from any unspecified multi-layer composite material,

[0017] **FIG. 8** shows a section through a piece cut from a conditioned multi-layer composite material,

[0018] where the same parts are indicated by the same reference numerals.

[0019] The first embodiment is shown in more detail in **FIG. 1**. For the package **1**, a standing bag was chosen in preference, of the kind that is used today in many fields for a variety of contents **6**, such as for foodstuffs and for animal feed. The standing bag was manufactured from a conventional multi-layer composite material **3**, preferably consisting of three layers **3'**, **3"** and **3'"**. One of the three layers, the outer layer **3'**, for example, was placed in a state of stress during the manufacture of the multi-layer composite material **3**, which at first produces no effects in the composition. A conventional shaping, filling and sealing machine was used to make the standing bag from this multi-layer composite material **3**, which had been subjected to this standard pre-treatment. In the embodiment, the standing bag is filled with the contents **6**, which could be dry feed for dogs, for example, and sealed. After sealing, the standing bag is subjected to conditioning by means of heat treatment, produced by UV radiation for instance, over its entire surface for example. It would also be possible to partially condition only one package wall **1'**, namely the one with the outer activated layer **3'**. Now the outer layer **3'**, which has been activated by a state of stress, expands, and the package **1**, in this embodiment the standing bag, rolls up monoaxially from the package opening towards the bottom of the package, until it reaches a level **5**, which is the upper level of the contents **6**. The consumer opens the package **1** and removes the desired amount of contents **6** each time. Every time contents **6** have been removed, the package **1** rolls up until it reaches the next lower level **5** of the contents in each case, as is shown in **FIG. 2**, until the package **1** has been emptied completely. In a second embodiment, as shown in **FIG. 3**, the package **1** preferably consists of any, preferably three-layered, multi-layer composite material **3**, the layers **3'**, **3"** or **3'"** of which do not have any stress frozen in. Before the shaping, filling and sealing process, a short adhesive label **4** is applied to one of the two package walls **1'**, beginning in the region of the opening of the package **1**. The adhesive label **4** consists, for example, of a three-layer multi-layer composite material **3**, the layer **3'"** has been pre-stressed during manufacture. Preferably after the package **1** has been filled and sealed, partial conditioning of the adhesive label **4** now takes place, in the form of heat treatment, so that its layer **3'"**, which has been activated by tension, now contracts, and the adhesive label **4** is caused to roll up monoaxially. The roll-up effect is transferred by the adhesive label **4** to the package **1**. In this example, the package **1** rolls up

as needed only as far as the end of the adhesive label **4**. **FIG. 4** shows the second embodiment, with an adhesive label **4** attached over the entire package wall **1'**, as a result of which this, too, rolls up monoaxially as far as the bottom of the package **1**, until it has been emptied completely. The roll-up effect is transferred to the package by the adhesive label **4** in this example. The adhesive label **4** can be stuck on and conditioned before, during or after the shaping, filling and sealing process. A third embodiment, as shown in **FIG. 5**, provides for a combination of the package **1** according to the first two embodiment versions. In this case, the package **1** is provided with a reinforcement **7** at the edges of the opening region, such as in the form of a conventional snap closure or the like, for catching the upper edges of the package opening. Finally, a fourth embodiment version, as shown in **FIG. 6**, provides for the rollup re-sealing system to be transferred to the package **1** made of any multi-layer composite material **3** preferably by tapes or strips **8** of rubber or flat elastomer applied under a tensioning force at least to one package wall **1'** of the package **1**. **FIG. 7** shows a conventional multi-layer material composition **3**, which is preferably formed from three layers **3'**, **3"** and **3'"** laminated or pasted on top of one another in a conventional manner. For the intended purpose of manufacturing the package with a roll-up re-sealing system, it is sufficient for at least one of the layers **3'** or **3"** or **3'"** to consist of a polymer, varnish or foam which is provided with an internal frozen-in stress during the lamination process and which expands or contracts during a conditioning process as a result of heat treatment and thus forms a conditioned multi-layer composite material **(2)**. If necessary, however, it is also possible to manufacture a multi-layer composite material **3** whose outer layer **3'** and inner layer **3'"** have a frozen-in state of stress and whose middle layer **3"** is dimensionally stable. When a multi-layer composite material **3** of this kind is conditioned, the inner layer **3'"**, for example, contracts, the outer layer **3'** expands. and the middle layer **3"** is rolled up monoaxially by the other two layers **3'** and **3'"** at the same time. The result is, for example, a conditioned multi-layer composite material **2**, such as is shown in more detail in **FIG. 8**. By having different material thicknesses and/or different dimensional stabilities in the layers of the composition, the roll-up behaviour of the material for the packages **1** can be controlled such that different roll-up diameters and roll-up thicknesses can be achieved. As a further control means, additional layers of conditionable material can be integrated into the multi-layer composite material **3**, which assist in regulating the build-up of tension within the composition.

1. A package made of flexible material that can be repeatedly sealed by rolling up, characterised in that a package **(1)** consists entirely or partially of a conditioned multi-layer composite material **(2)**, or that the package **(1)** consists of any multi-layer composite material **(3)** and an adhesive label **(4)** made from the conditioned multilayer composite material **(2)** is disposed on at least one package wall **(1')** beginning in the region of the opening, that, after conditioning, the package **(1)** repeatedly rolls up monoaxially, automatically and in a controlled manner, from the package opening in the direction of the bottom of the package as far as the level **(5)** of the contents **(6)** at any particular time and seals itself, and that the process of rolling up and sealing is implemented by the properties of the conditioned multi-layer composite material **(2)** of the package **(1)** or of the adhesive label **(4)**, the properties being transferred to the package **(1)** either directly or by the adhesive label **(4)**.

2. The package as claimed in claim 1, characterised in that the multi-layer composite material **(3)** consists of a composition of at least two layers, which are laminated or pasted in a conventional manner, that at least one layer as desired **(3')** or **(3")**, consisting of a polymer, varnish or foam, possesses an internal frozen-in stress that expands or contracts during a conditioning process as a result of heat treatment and thus forms a conditioned multi-layer composite material **(2)** which rolls up monoaxially, and that by giving the layers of the composition different material thicknesses and/or different dimensional stabilities, different roll-up diameters and roll-up thicknesses can be implemented.

3. The package as claimed in claim 1, characterised in that, in addition to the conditioned multi-layer composite material **(2)** of the package **(1)** or the adhesive label **(4)**, the package **(1)** is combined in the region of the opening with a conventional reinforcement **(7)** to catch the upper edges of the package opening.

4. The package as claimed in claim 1, characterised in that the process of rolling up and sealing can be transferred to the unspecified multi-layer composite material **(3)** of the package **(1)** by tapes or strips **(8)** of rubber or flat elastomer disposed on at least one package wall **(1')** of the package **(1)** and applied under a tensioning force.

5. A process for manufacturing the package as claimed in claim 1, characterised in that the unspecified multi-layer composite material **(3)** is conditioned on conventional machines or facilities for manufacturing packages **(1)** before, during or after the process of shaping, filling and sealing the package **(1)**, by means of heat treatment, that the conditioning is extended to the entire multi-layer composite material **(3)** or is limited partially to definable regions of the multi-layer composite material **(3)** of the package **(1)** or of the adhesive label **(4)**, and that the adhesive label **(4)** is conditioned before or after it is stuck to the multi-layer composite material **(3)** of the package **(1)**.

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