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(54) **METHOD OF PACKING A MATTRESS**

(57) The present invention discloses a method of packing a mattress comprising applying a film around a mattress; reducing the dimensions of the mattress by compression or vacuum suctioning; sealing the film, thereby packing the mattress substantially hermetically; reshaping the mattress by rolling or folding; and providing a cover material around the mattress, thereby forming an elongated tube (2, 11) comprising the reshaped, sealed and compressed mattress (3); wherein opening

means (10, 15, 16, 17, 18) is provided within the tube (2, 11) and extends from an intermediate position or an extremity (12, 13) of the tube in a direction towards one or both, or the other extremity (13, 12) of the tube. Further disclosed is a packed mattress (1) comprised in an elongated tube (2, 11), and a method of unpacking the packed mattress (1) comprised in an elongated tube (2, 11) by opening the elongated tube (2, 11) via opening means (10, 15, 16, 17, 18) provided within the tube (2, 11).

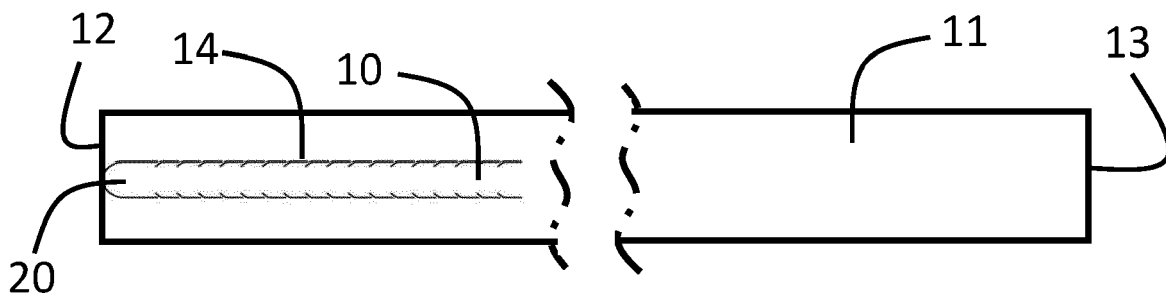


Fig. 2

Description

Technical Field

[0001] The present invention relates to a method of packing a mattress, a packed mattress comprised in an elongated tube, and a method of unpacking a mattress.

Background Art

[0002] Mattresses are bulky, often heavy, items that are difficult to handle and transport, in particular from the manufacturing plant to the retail store or directly from the retail store to the end customer. Often, mattresses are packed and sold in a flat configuration, whereby the mattress has the same dimensions during all phases of handling and transport. In order to improve the handling, methods to compress mattresses before placing in a packaging material, such as a box or a plastic bag, have been developed.

[0003] US 8,443,974 discloses a bedding article that is compressed and rolled from two side edges to form a rolled bedding article having two rolled portions. The rolled bedding article is fitted into a rectangular prism-shaped container. Multiple containers that contain such rolled bedding articles can be placed on a retail-store merchandise shelf. Unpacking the mattress includes opening the box and manually lifting the rolled mattress out of the box.

[0004] BR102018072864 discloses a method for packing a spring mattress in a cardboard box. The method comprises compressing the mattress, folding the compressed mattress, compressing the folded mattress, vacuum packing and sealing the compressed mattress, followed by rolling and placing the rolled mattress in a cardboard box with a square cross-section. Unpacking the mattress includes opening the box and manually lifting the rolled mattress out of the box, after which the mattress unrolls and the seal is broken to decompress the mattress.

[0005] US 2016/0304231 discloses a method of manufacturing and packing a mattress. Packing the mattress includes compressing and rolling a finished mattress, placing the compressed and rolled mattress into a bag, sealing the bag and passing the sealed bag through the open upper end of an elongated container having a closed bottom end and placing a cap is over the open upper end of the elongated container. Unpacking the mattress includes removing the cap, manually removing the rolled mattress from the elongated container via de

container via the open upper end, which allows the mattress to unroll, and cutting the plastic film to decompress the mattress.

[0006] A disadvantage of the foregoing packing methods during unpacking the mattress is the need for manual removal of the rolled and compressed mattress from the box or container. Since mattresses tend to be heavy and bulky, manually lifting or tearing the mattress to remove it from its box or container is cumbersome and requires a certain physical strength. Other disadvantages during unpacking the mattress are the need for cutting tools to open the container or box, and that upon removal of the mattress from its box, container or sleeve, it unrolls and decompresses at the same time, making it more difficult to control the unrolling and decompression.

Summary of the Invention

[0007] It is an object of the present invention to overcome one or more of the above drawbacks. It is an aim of the invention to provide an improved method of packing a mattress, which is less complex. It is a further aim of the invention to provide an improved method of unpacking a mattress, which has one or more of the following advantages: unpacking the mattress is less complex, is faster and can be done in a more controlled way.

[0008] It is a further aim of the present invention to provide a packed mattress obtained by the packing methods of the present invention.

[0009] According to a first aspect of the invention, there is provided a method of packing a mattress according to the appended claims. A method of packing a mattress described herein comprises the steps of (i) applying a film around a mattress; (ii) reducing the dimensions of the mattress; (iii) sealing the film; (iv) reshaping the mattress; and (v) providing a cover material around the reshaped, sealed and compressed mattress, thereby forming an elongated tube comprising the reshaped, sealed and compressed mattress; wherein opening means is provided within the elongated tube, the opening means extending from an intermediate position of the tube in a direction towards one or both extremities of the tube, or from an extremity of the tube in a direction towards other extremity of the tube.

[0010] Preferably, the film is a plastic film. Advantageously, the dimensions of the mattress are reduced by means of compression or vacuum suctioning. Advantageously, upon sealing the film, the mattress is packed substantially hermetically. With substantially hermetically it is meant that the mattress is packed almost airtight within the plastic film.

[0011] Advantageously, the mattress is reshaped by rolling the mattress or by folding the mattress. When the mattress is folded, it can be folded so that a head of the mattress is aligned with a foot of the mattress. The mattress can be folded once or multiple times.

[0012] With the opening means being provided within the tube it is meant that the opening means can be pro-

vided at the outer surface, the interior and/or at the inner surface of the tube. The inner surface of the tube is the surface facing the reshaped, sealed and compressed mattress.

[0013] With the opening means extending from an intermediate position, it is meant that one or both extremities of the opening means are provided within the tube at a position other than an extremity of the tube. For example, an intermediate position can be at a position that is halfway between both extremities of the elongated tube.

[0014] With the opening means extending in a direction towards one or both, or the other extremity of the elongated tube, it is meant that the overall direction, or the average direction, of the opening means are directed towards the one or both, or the other end of the elongated tube.

[0015] The cover material can be provided as a sheet. The elongated tube can be obtained by winding the sheet around the reshaped, sealed and compressed mattress. Advantageously, an elongated tube is obtained by attaching two ends parts of the sheet to each other. The end parts of the sheet can be attached to each other by means of, without being limited thereto, an adhesive or by means of protrusions and openings provided in the sheet.

[0016] Alternatively, the cover material can be provided as a pre-formed tube, i.e. a tube that has been obtained prior to placing the reshaped, sealed and compressed mattress within the tube.

[0017] The cover material can be a fibreboard. Preferably, the fibreboard is a cardboard. The fibreboard can be corrugated, such as a corrugated cardboard.

[0018] Alternatively, the cover material can comprise a polymer, such as polypropylene, polyethylene, polyvinylchloride, or a combination of polymers. The cover material comprising a polymer can be a textile material. Alternatively, the polymer material can be a film, a foil or a foam material.

[0019] The opening means can extend from one extremity of the elongated tube to the other extremity. This allows opening of the tube comprising the reshaped, sealed and compressed mattress, from one end to the other end. The opening means can be substantially parallel to the longitudinal axis of the elongated tube. In other words, the overall direction of the opening means may follow the longitudinal axis of the tube. Preferably, the opening means are parallel to the longitudinal axis of the tube, i.e. the opening means is provided in a substantially straight line. Alternatively, the opening means can be provided in a sinusoidal manner, a cascading manner, or other shapes.

[0020] Preferably, the opening means comprises a tear strip. Alternatively or additionally, the opening means can comprise a zipper, one or more buttons, or a Velcro strip. The opening means, and in particular the tear strip, can comprise pre-cut holes in the cover material. Alternatively or additionally, the tear strip can comprise a poly-

meric film. The polymeric film can be a multi-layer film. Preferably, the polymeric film is provided at the exterior and/or within the elongated tube. Preferably the polymeric film is an adhesive tape. More preferably, the polymeric film is an adhesive tape covering a pre-cut cover material. Preferably, the tear strip comprises pre-cut through-holes in the cover material, in particular a cardboard, such as a corrugated cardboard, and an adhesive tape covering the pre-cut holes.

[0021] According to a second aspect of the invention, there is provided a packed mattress according to the appended claims. Packed mattresses described herein are comprised in an elongated tube. Advantageously, the mattress in combination with the elongated tube is packed according to packing methods of the invention. Advantageously, the elongated tube comprises opening means extending from an intermediate position or an extremity of the tube in a direction towards one or both, or the other extremity of the tube, respectively. The elongated tube and the opening means are preferably as described herein-above. Extending substantially is to be interpreted as defined herein-above.

[0022] According to a further aspect of the invention, there is provided a method of unpacking a mattress according to the appended claims.

[0023] Advantageously, the mattress is unpacked when it has arrived at its final destination, for example in the home of the end customer who purchased the mattress.

[0024] Methods of unpacking a mattress described herein comprise unpacking a packed mattress comprised in an elongated tube. Preferably, the mattress comprised in an elongated tube is according to the second aspect of the invention. Preferably, the mattress in combination with the tube are packed according to methods of packing a mattress according to the invention. Advantageously, the method of unpacking comprises opening the elongated tube via opening means provided within the tube. Advantageously, the elongated tube comprises opening means extending from an intermediate position or an extremity of the tube in a direction towards one or both, or the other extremity of the tube, respectively.

[0025] Advantages of the methods of packing of the present invention are, without being limited thereto, a less complex packing process and the provision of easy opening of the elongated tube for unpacking the mattress, thereby excluding the need for cutting tools. The tube can further be made of a recycled material and/or can be recycled or re-used afterwards.

[0026] Advantages of the methods of unpacking of the present invention are, without being limited thereto, an easy opening of the elongated tube for unpacking the mattress, exclusion of the need for cutting tools, and excluding the need to manually take the mattress out of the tube, box or container.

Brief Description of Drawings

[0027] Aspects of the invention will now be described in more detail with reference to the appended drawings, wherein same reference numerals illustrate same features.

Figure 1 schematically represents a cross-sectional view of a packed mattress comprised in an elongated tube according to the invention.

Figures 2 to 5 schematically represent a top-view of tear strips provided within the elongated tube according to the invention.

Figures 6 to 8 schematically represent a cross-sectional view of tear strips provided within the elongated tube according to the invention.

Detailed description

[0028] The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided for thoroughness and completeness.

[0029] The mattress packed and unpacked in the present invention can be any type of mattress known in the art. Examples of known mattresses are spring mattresses and mattresses comprising a memory foam. The mattress can have dimensions which are dimensions known in the field, such as the dimensions of a single person mattress or a double person mattress.

[0030] According to the method of the present invention, a film is applied around a mattress. Advantageously, the film is flexible so as to be capable of being reshaped, i.e. being rolled or being folded at least one time. Advantageously, the film is capable of being sealed so as to form a substantially air-tight or substantially hermetic seal. Advantageously, the film around the mattress has one or two open sides. When the film has one open side, it can be seen as a bag applied around a mattress. When the film has two open sides, the open sides are preferably located at opposing sides of the mattress, such as the so-called head side and the so-called foot-side.

[0031] Preferably, the film is a plastic film. The plastic film can comprise one or more polymers, such as a polyolefin, for example polyethylene (PE) or polypropylene (PP). Preferably, the polymers are easily recyclable.

[0032] According to the method, the dimensions of the mattress are reduced. Preferably, at least one dimension of the mattress is reduced, for example the thickness. The thickness of the mattress can be reduced to between 1% and 90% of its original thickness, such as to between 10% and 80%, between 20% and 75%, between 30% and 60%, or between 5% and 50% of its original thickness. The dimensions of the mattress can be reduced

by means of compression or vacuum suctioning, or any other methods that allow the removal of air comprised within the mattress. Compression and vacuum suctioning may be performed according to techniques known in the art, for example according to the method described in US 4,711,067.

[0033] Optionally, the mattress can be folded prior to the step of reducing its dimensions. Alternatively (and optionally), the mattress can be folded after the step of reducing its dimensions and prior to sealing the film. Preferably, the mattress is folded so that a head of the mattress is aligned with a foot of the mattress. When the film has an open side at the head-side and at the foot-side of the mattress, the open sides of the film are brought together upon folding the mattress so that a head of the mattress is aligned with a foot of the mattress. The mattress can be folded multiple times, such as two times, three times or four times.

[0034] Upon reduction of the dimensions of the mattress, the film is sealed. Advantageously, the film is sealed by methods known in the art, such as by means of hot melting or heat sealing, applying a gluing, ultrasonic welding, etc. Advantageously, upon sealing the film, the mattress is packed substantially hermetically. Preferably, the mattress is packed in an air-tight manner within the sealed film. The substantially hermetical packing of the mattress in the sealed film will maintain the mattress in its compressed form until the seal is broken. The seal can be broken by opening the film, e.g. by cutting, puncturing or tearing it open. Upon opening, air comes into contact with the compressed mattress, which will expand or decompress back into its original position. If the mattress is folded prior to sealing the film, the compressed and folded mattress will expand and unfold back into its original position upon opening the film (breaking the seal).

[0035] In particular, when the film has an open side at the head-side and at the foot-side of the mattress and the mattress is folded prior or after the step of reducing the dimensions of the mattress so that the open sides of the film are brought together, both open sides can be sealed together in a single sealing step. When the seal is broken by opening the film, air comes into contact with the compressed and folded mattress, which will expand and unfold back into its original position.

[0036] According to the method of the invention, the mattress is reshaped. Advantageously, the sealed and compressed, and optionally folded, mattress is reshaped. With reshaping it is meant giving the mattress another shape or form. Advantageously, the reshaping brings the mattress in a shape or form that allows to provide easily a cover material around the mattress in a next step. Preferably, the mattress is reshaped by rolling. Optionally, the mattress can be rolled onto a core. Preferably, the core is a core as known in the field, such as a cardboard tube or a polymeric tube.

[0037] Alternatively, the mattress is reshaped by folding the mattress. The mattress can be folded so that a

head of the mattress is aligned with a foot of the mattress. The mattress can be folded multiple times, such as two, three or four times. The mattress can also be reshaped by a combination of folding and rolling.

[0038] In a next step according to the method of the invention, a cover material is provided around the reshaped, sealed and compressed mattress. Referring to Fig. 1, the mattress is reshaped by rolling. Upon provision of a cover material 2 around the mattress 3, an elongated tube 1 comprising the rolled, sealed and compressed mattress is obtained.

[0039] The composition, the structure, the dimensions, in particular the thickness, and/or the characteristics, in particular the flexibility and the elasticity, of the cover material are selected so that the elongated tube can withstand the force and pressure applied by the mattress on the inner side of the tube. As it will be understood, the reshaped, sealed and compressed mattress comprises the mattress in an unnatural, unstable, and stressed condition - the natural and stable condition being expanded and flat. Consequently, the reshaped, sealed and compressed mattress, wanting to go back to its natural, stable condition, will apply a force and pressure on the elongated tube. In order for providing easy, safe and secure handling and transport, the properties of the cover material are to be selected to be capable to withstand this force and pressure, which depend on the type of mattress, its dimensions, and on the compression, sealing and reshaping conditions.

[0040] Further, the cover material is also selected to allow the provision of opening means to provide for an easy opening of the elongated tube during unpacking of the packed mattress.

[0041] The cover material can be a fibreboard, a film, a foil, a textile, a foam, or a combination thereof. The cover material can comprise a polymer. The cover material can be a composite material, such as a fibre reinforced composite. The composite can be a composite comprising a polymeric matrix reinforced by fibres, such as cellulose fibres, flax fibres, glass fibres, or other fibres known in the field of fibre reinforced composites.

[0042] A fibreboard as used herein is a material comprising fibres. The fibres can be natural fibres, such as cellulose fibres, for example wood fibres, flax fibres, hemp fibres, or wool fibres. The fibres can also be man-made or synthetic fibres, such as regenerated cellulose fibres. Preferably, the fibres are cellulose fibres. The fibreboard can be a low density fibreboard (LDF), a medium density fibreboard (MDF) or a high density fibreboard (HDF). Preferably, the fibreboard is a cardboard. The fibreboard can be corrugated. According to a preferred embodiment, the cover material is a corrugated cardboard. The structure of the corrugated cardboard can be a single face cardboard, a single wall cardboard, a double wall cardboard, a triple wall cardboard, or a cardboard comprising four, five, or more walls.

[0043] The polymer or polymers comprised in the cover material can be any polymer that can withstand the force

and pressure applied by the mattress on the inner side of the elongated tube. To this end, the cover material preferably has a limited elasticity. A too high elasticity might lead to stretching or elongation of the cover material under the force and pressure applied by the mattress on the inner side of the elongated tube, leading to a packed mattress having larger dimensions.

[0044] Examples of polymers that can be used are polyolefins, such as polypropylene (PP) or polyethylene (PE), polyvinylchloride (PVC), polyamides (PA), or polyesters (PES), such as polyethylene terephthalate (PET) or polybutylene terephthalate (PBT). The polymer can be a homopolymer or a copolymer.

[0045] When the cover material is provided as a textile, the textile can be a nonwoven, a woven or a knitted material, or a textile comprising a combination thereof.

[0046] When the cover material is a foam, the foam can be an open cell foam or a closed cell foam, or a foam comprising both open cells and closed cells. The foam can be foreseen to be reduced in thickness by the force and pressure applied by the reshaped, sealed and compressed mattress on the inner side of the elongated tube.

[0047] According to a first embodiment of the elongated tube, the cover material can be provided as a sheet.

The elongated tube can be obtained by winding the sheet around the reshaped, sealed and compressed mattress. Preferably, a first portion of the sheet is attached to a second portion of the sheet, for example first and second edges or end parts of the sheet, preferably opposing first and second edges of the sheet. This provides the elongated tube with a resistance against the force applied to its inner side by the mattress, as explained above. The first and second portions of the sheet can be attached to each other by means of attaching means known in the art, such as an adhesive in the form of glue, a hot melt or an adhesive strip, by means of protrusions (e.g. flaps) and openings (e.g. slits) provided in the cover material sheet, by means of hooks or clamps, or lacing means. With lacing means it is meant that pre-cut openings are provided in both edges or end parts of the sheet and that one or more ropes are used to lace up the sheet after having been wound, rolled or wrapped around the reshaped, sealed and compressed mattress. The pre-cut openings can be foreseen of reinforcing means, such as a metal ring.

[0048] According to a second embodiment of the elongated tube, the cover material can be provided as a pre-formed tube. A pre-formed tube is defined as a tube that has received its final shape prior to use, in this case prior to placing the reshaped, sealed and compressed mattress within the tube. Advantageously, when the elongated tube is a pre-formed tube, the reshaped, sealed and compressed mattress is slid into the tube via an open end.

[0049] The pre-formed tube can have a circular cross-section. Alternatively, the pre-formed tube can have a polygonal cross-section, such as a regular polygonal cross-section. Examples of polygonal cross-sections are triangles, rectangles such as squares, hexagonal cross-

sections or octagonal cross-sections.

[0050] The ends of the elongated tube comprising the mattress can be provided as open ends or as closed ends. A closed end can be an open end that is closed after obtaining the elongated tube comprising the reshaped, sealed and compressed mattress. An end can be closed by means of known closing means, such as a cap that is placed over the open end, or adhesive tape.

[0051] When the tube is provided as a pre-formed tube, one end can be provided as a closed end, leaving the other end open to allow provision of the mattress in the elongated tube via the open end, or as an open end which is closed after providing the mattress in the tube. When the tube is obtained by winding the cover material sheet around the mattress, the ends are typically provided as open ends, which can be closed as explained above.

[0052] Preferably, the elongated tube has a circular cross-section, in particular when the mattress is rolled during the reshaping step. Alternatively, the elongated tube can have a polygonal cross-section such as a triangular, a square, a rectangular, a hexagonal or an octagonal cross-section. Preferably, the cross-section of the elongated tube allows easy stacking of the tubes. Easy stacking allows easier transport and/or easier stacking of the articles on a shelf.

[0053] Advantageously, the elongated tube comprises opening means. Advantageously, the opening means is provided within the tube. Advantageously, the opening means extends from an intermediate position or from one or both extremities of the elongated tube. Advantageously, when the opening means extends from an intermediate position, it extends in a direction towards one or both extremities of the elongated tube. Advantageously, when the opening means extends from one or both extremities of the tube, it extends from each extremity in a direction towards the opposed extremity of the tube.

[0054] The opening means can comprise a tear strip, a zipper, one or more buttons, a Velcro strip, a lacing means, or a combination thereof. Which type of opening means is used, depends on the cover material and on the reshaped, sealed and compressed mattress. For example, when the force and pressure applied by the mattress on the inner side of the elongated tube is moderate, less strong opening means can be provided, such as one or more buttons or a Velcro strip.

[0055] The lacing means are as described herein-before. The lacing means provide for easy opening by detaching the rope at one end, and tearing it away from the elongated tube, thereby opening the elongated tube.

[0056] When the cover material is a fibreboard, in particular a cardboard, the opening means is preferably a tear strip, a Velcro strip, lacing means, or a combination thereof. When the cover material is a textile, a film, a foil or a foam, the opening means is preferably a tear strip, a zipper, one or more buttons, a Velcro strip, a lacing means, or a combination thereof.

[0057] The opening means can be non-destructive opening means, i.e. opening means that allows reuse of

the cover material. Non-destructive opening means does not damage the cover material upon opening the elongated tube, for example a zipper, one or more buttons, a Velcro strip, or lacing means. In particular, when the cover material is provided as a sheet and wherein the elongated tube is obtained by winding, wrapping or rolling the sheet around the reshaped, sealed and compressed mattress, the opening means is preferably a non-destructive opening means.

[0058] Referring to Fig. 2 to 5, top-views of an elongated tube 11 comprising opening means 10, 15, 16, 17, 18 according to the invention are schematically shown.

[0059] Fig. 2 shows opening means 10 provided within the tube 11 at one extremity 12 and extending in a direction towards the other extremity 13 of the tube 11. The opening means 10 is substantially parallel to the longitudinal axis of the elongated tube and comprises a tear strip.

[0060] The tear strip comprises pre-cut holes 14 in the cover material. Pre-cut holes can be obtained by perforating the cover material. The pre-cut holes can be through-holes, blind holes, or a combination thereof.

[0061] The opening means 10 are provided so that upon tearing the tear strip along the pre-cut holes 14, the force applied by the mattress to the inner side of the elongated tube is sufficiently high to further open the elongated tube and unroll the sealed and compressed mattress.

[0062] Fig. 3 shows opening means 15, 16 provided within the tube 11 at both extremities 12, 13 and extending substantially in a direction towards the opposed extremity 13, 12 of the tube 11. The opening means 15, 16 are substantially parallel to the longitudinal axis of the elongated tube 11 and comprise tear strips. The tear strips comprise pre-cut holes 14 in the cover material. The opening means 15, 16 are provided so that upon tearing the tear strip along the pre-cut holes 14, the force applied by the mattress to the inner side of the elongated tube is sufficiently high to further open the elongated tube and unroll the sealed and compressed mattress.

[0063] Fig. 4 shows opening means 17 provided within the tube 11. The opening means 17 extends from one extremity 12 of the elongated tube to the other extremity 13. This allows opening of the tube from one end to the other end. The opening means 17 is parallel to the longitudinal axis of the elongated tube 11 and comprises a tear strip. The tear strip comprises pre-cut holes 14 in the cover material.

[0064] Fig. 5 shows opening means 18 provided within the tube 11. The opening means 18 extends from one extremity 12 of the elongated tube to the other extremity 13. This allows opening of the tube from one end to the other end. The opening means 18 is provided in a sinusoidal manner. The opening means 18 comprises a tear strip. The tear strip comprises pre-cut holes 19 in the cover material.

[0065] It is to be understood that variations or combinations of the embodiments shown in Fig. 2 to Fig. 5 are

also possible.

[0066] According to another embodiment, the opening means can be provided in other manners, such as a step-wise manner.

[0067] According to a further embodiment, the opening means can comprise further tear strips, e.g. a second tear strip, at one or both extremities of the tube, extending substantially in a direction towards the other extremity of the tube.

[0068] Alternatively or additionally to the pre-cut holes, the tear strip can comprise a polymeric film. The polymeric film can comprise one or more polymers, such as a polyolefin, for example polypropylene (PP) or polyethylene (PE), or a non-olefinic polymer, such as a polar non-olefinic polymer. Examples of polar non-olefinic polymers are polyesters such as polyethylene terephthalate and polybutylene terephthalate, polyamides, polyoxymethylene, polyarylene sulfides, polyarylene oxides and polyurethanes.

[0069] The polymeric film can comprise a polyolefin polymer that is stretched in the longitudinal direction of the film. Stretching of the polymer in the longitudinal direction can increase the strength of the polymeric strip, thereby reducing the risk of the polymer film breaking upon opening the elongated tube.

[0070] The polymeric film can comprise one or more layers, i.e. can be a single-layer film or a multi-layer film. When the polymeric film comprises two or more layers, the layers can be the same or can be different.

[0071] The polymeric film can be attached to the cover material by means of an adhesive. Advantageously, the adhesive attaches the polymeric film to the cover material in a way that upon opening the elongated tube via the tear strip comprising the polymeric film, the polymeric film removes a portion of the cover material, thereby opening the elongated container. In other words, the adhesive must be selected so that upon opening the tube via the tear strip comprising the polymeric film, the polymeric film does not detach from the cover material, thereby leaving the elongated tube closed. An example of a suitable adhesive is a heat-activated adhesive, such as a hot melt. Other adhesives known in the art that fulfil the above-mentioned requirement can be used as well.

[0072] The polymeric film can be an adhesive tape. An adhesive tape can self-attach to the substrate it is applied to, by means of an adhesive foreseen in the tape, such as an adhesive coating or an adhesive layer.

[0073] Preferably, the tear strip comprises pre-cut holes in the cover material and an adhesive tape as polymeric film, wherein the adhesive tape covers the pre-cut holes.

[0074] Fig. 6 shows schematically a cross-section of an elongated tube of the invention. The cover material is a double wall corrugated cardboard 21. The opening means comprises a polymeric film 22. The polymeric film 22 is attached to the external surface 23 of the elongated tube.

[0075] Fig. 7 shows schematically a cross-section of

another embodiment of the opening means comprising a polymeric film 24. The cover material is a single wall corrugated cardboard 25. The polymeric film 24 is attached to the external surface 26 and to the interior 27 of the elongated tube.

[0076] Fig. 8 shows schematically a cross-section of yet another embodiment of the opening means comprising a polymeric film 28. The cover material is a double wall corrugated cardboard 29. The polymeric film 28 is attached to the external surface 30, the inner surface 31 and to the interior 32 of the elongated tube.

[0077] According to another embodiment (not shown), the opening means can comprise a first polymeric film provided to, preferably attached to, the outer surface of the elongated tube, and a second polymeric film provided to, preferably attached to, the inner surface of the elongated tube. The first and second polymeric film can be the same or can be different, e.g. having a different composition, structure, width or thickness.

[0078] Advantageously, the opening means of the present invention allows opening of the elongated tube without the need for tools, such as cutting tools. Preferably, the opening means allows opening of the elongated tube in a straightforward and easy way.

[0079] Further, the opening means is at the same time capable of resisting the force and pressure applied by the reshaped, sealed and comprised mattress to the inner surface of the elongated tube. This ensures safe packing, handling, storage and transport of the mattress, in combination with easy unpacking of the mattress once arrived at its destination.

[0080] Opening means as disclosed in the present invention provides guiding means to the user and allows easy opening.

[0081] When the opening means extends from an extremity of the tube in a direction towards the other extremity of the tube, the opening means can comprise at one or more of its ends a portion allowing to easily take or grab the opening means.

[0082] When the opening means extends from an intermediate position of the tube in a direction towards one or both extremities of the tube, the opening means can comprise at one or more of its ends a portion for easy grabbing the opening means.

[0083] Such a portion can comprise a lid, for example a lid 20 as shown in Fig. 2 to 4. Alternatively, the portion can comprise an opening (not shown), for example an opening allowing one or more fingers to reach the inner surface of the elongated tube, allowing easier grabbing of the opening means.

[0084] The elongated tube can further comprise means for easier handling, in particular carrying. Handling means can be any means known in the art, for example a handle or an opening allowing a person to pass a finger or a hand to the inner surface of the elongated tube.

[0085] The handling means can be provided in the same material as the cover material, or in a different ma-

terial.

[0086] The handling means can be provided in the cover material, such as pre-cut openings or a handle that can be lifted up, or other embodiments known in the art of packaging.

[0087] Alternatively or additionally, the handling means can be attached to the elongated tube by using an adhesive, such as glue, by stitching or by any other means known in the field. When the elongated tube is closed at its ends, handling means can be provided at the end portions.

[0088] The elongated tube can comprise a label attached to its exterior surface. The label can be printed to the elongated tube using known printing methods suitable for printing on the cover material. Alternatively or additionally, the label can be attached to the elongated tube using known attachment methods, such as an adhesive, for example a glue, a pressure sensitive adhesive or a hot melt.

[0089] According to a second aspect of the invention, there is provided a packed mattress 1, wherein the packed mattress 1 is comprised in an elongated tube 2, 11. Advantageously, the packed mattress 1 is a reshaped, sealed and compressed mattress 3. Advantageously, the mattress 3 in combination with the tube 2, 11 is packed according to methods of packing of the invention. Advantageously, the elongated tube 2, 11 comprises opening means 10, 15, 16, 17, 18 extending from an intermediate position or an extremity 12, 13 of the tube 2, 11 in a direction towards one or both, or the other extremity 13, 12 of the tube 2, 11.

[0090] The cover material and the opening means are as described herein-above.

[0091] According to a further aspect of the invention, there is provided a method of unpacking a packed mattress 1. Advantageously, the packed mattress 1 is comprised in an elongated tube 2, 11. Advantageously, the packed mattress is according to the second aspect of the invention. Advantageously, the mattress is unpacked by opening the elongated tube 2, 11 via opening means 10, 15, 16, 17, 18 provided within the tube 2, 11. Advantageously, the opening means 10, 15, 16, 17, 18 extends from an intermediate position or an extremity 12, 13 of the tube 2, 11 in a direction towards one or both, or the other extremity 13, 12 of the tube 2, 11. Preferably, the mattress is packed according to methods of packing of the invention.

[0092] The inventors have discovered that the reshaped, sealed and compressed mattress unrolls upon opening of the elongated tube via the opening means. In other words, the opening means of the invention open the elongated tube in a way that the stresses comprised within the reshaped, sealed and compressed mattress and resulting from the mattress being in a unnatural, unstable position leave the mattress by unrolling the sealed and compressed mattress to a more natural, more stable, less stressed, and flat position.

[0093] Advantageously, after unrolling, the seal is broken,

by known methods to open a bag or film, such as using a cutter or tearing the film, and the mattress expands (decompresses) back to its original dimensions.

[0094] The advantages of the opening means of the present invention are that, besides the fact that no cutting tools are required, it is not necessary to manually take the mattress out of the elongated tube. Further, since the mattress unrolls while being sealed and compressed, the unpacking takes place in a controlled way.

Claims

1. A method of packing a mattress comprising:

- (i). applying a film around a mattress, preferably a plastic film;
- (ii). reducing the dimensions of the mattress by compression or vacuum suctioning;
- (iii). sealing the film, thereby packing the mattress substantially hermetically;
- (iv). reshaping the mattress by rolling the mattress or by folding the mattress; and
- (v). providing a cover material around the reshaped, sealed and compressed mattress, thereby forming an elongated tube (2, 11) comprising the reshaped, sealed and compressed mattress (3);

characterized in that opening means (10, 15, 16, 17, 18) is provided within the elongated tube (2, 11), said means extending from:

- an intermediate position of said tube (2, 11) in a direction towards one or both extremities (12, 13) of said tube (2, 11), or
- an extremity (12, 13) of said tube (2, 11) in a direction towards the other extremity (13, 12) of said tube (2, 11).

2. The method of claim 1, wherein the cover material is provided as a sheet and wherein the elongated tube is obtained by winding the sheet around the reshaped, sealed and compressed mattress.

3. The method of claim 1, wherein the cover material is provided as a pre-formed tube.

4. The method of any one of the preceding claims, wherein the cover material is a fibreboard, preferably a cardboard, more preferably a corrugated cardboard.

5. The method of any one of claims 1 to 3, wherein the cover material comprises a polymer.

6. The method of claim 5, wherein the cover material is a textile.

7. The method of any one of the preceding claims, wherein the opening means (17, 18) extends from the extremity (12) of the elongated tube (2, 11) to the other extremity (13). 5
8. The method of any one of the preceding claims, wherein the opening means (17) is parallel to the longitudinal axis of the elongated tube (2, 11).
9. The method of any one of the preceding claims, wherein the opening means (10, 15, 16, 17, 18) comprises a tear strip. 10
10. The method of claim 9, wherein the tear strip comprises pre-cut holes (14, 19) in the cover material. 15
11. The method of claim 9 or 10, wherein the tear strip comprises a polymeric film (22, 24, 28).
12. The method of claim 11, wherein the polymeric film (22, 24, 28) is provided at the exterior (23, 26, 30) of and/or within the elongated tube (2, 11). 20
13. The method of any one of claims 1 to 8, wherein the opening means comprises a zipper. 25
14. Packed mattress (1) comprised in an elongated tube (2, 11), wherein the mattress (3) in combination with said tube (2, 11) are packed according to any one of claims 1 to 13. 30
15. A method of unpacking a packed mattress comprised in an elongated tube (2, 11) according to claim 14, by opening the elongated tube (2, 11) via opening means (10, 15, 16, 17, 18) provided within the tube (2, 11). 35

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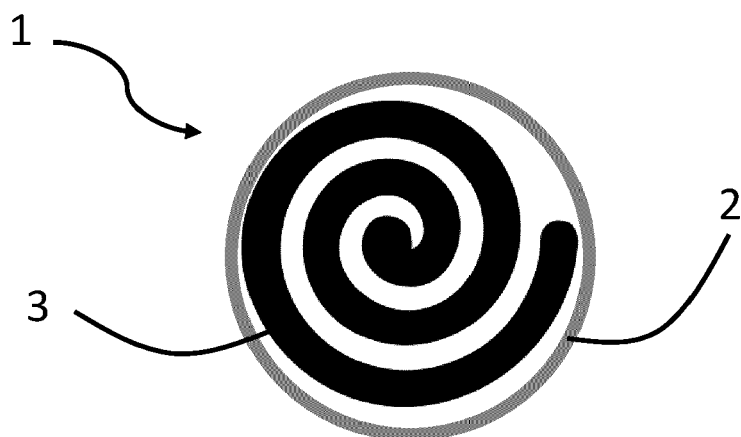


Fig. 1

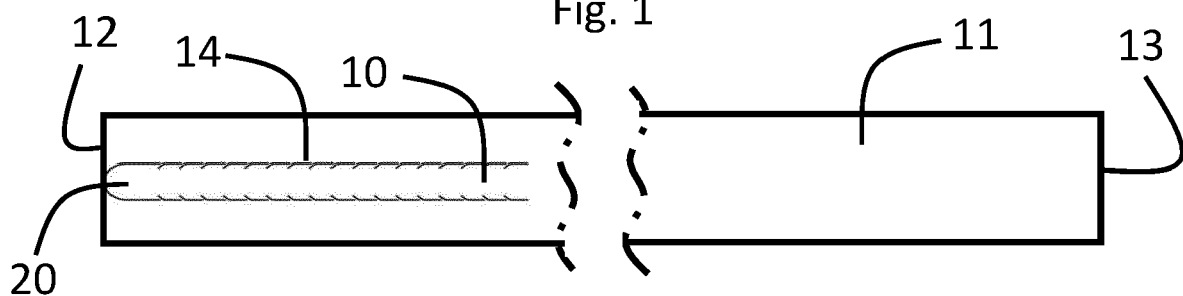


Fig. 2

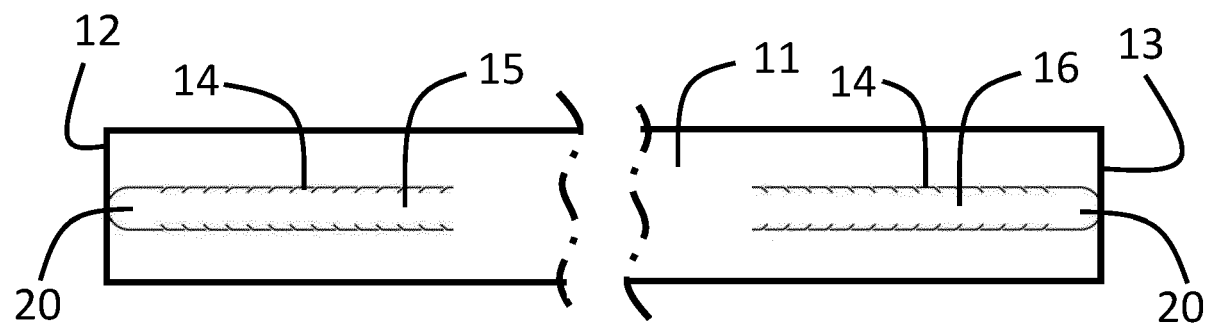


Fig. 3

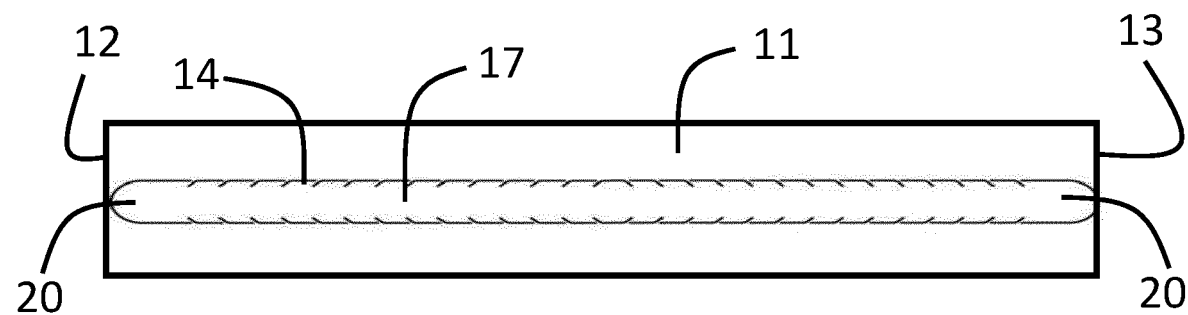


Fig. 4

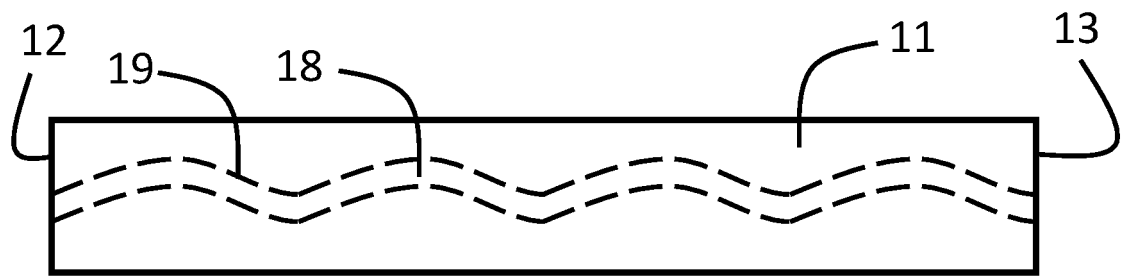


Fig. 5

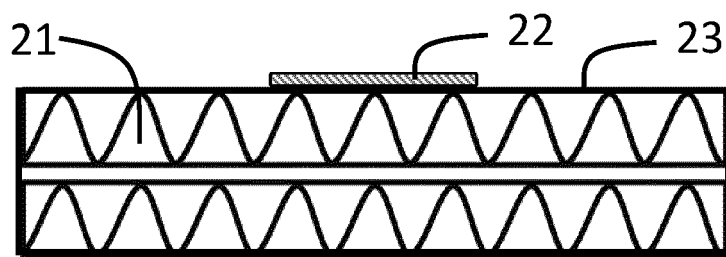


Fig. 6

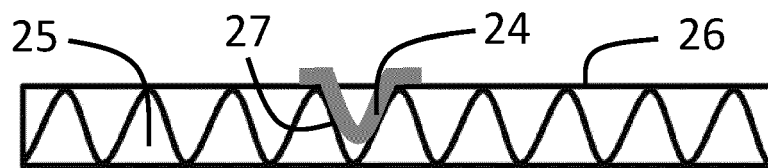


Fig. 7

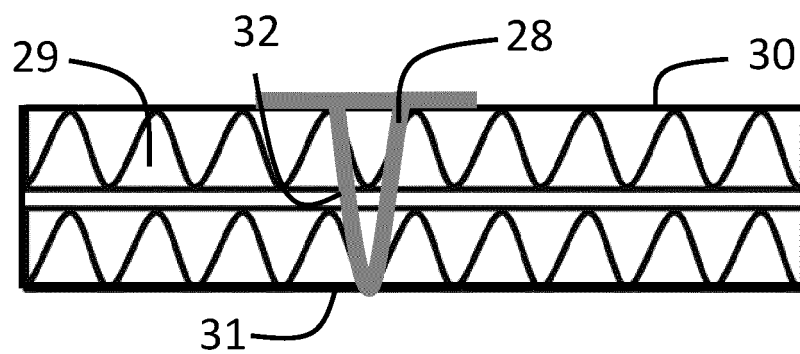


Fig. 8



EUROPEAN SEARCH REPORT

 Application Number
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Y	* column 3, line 42 - column 7, line 55; figures 1-23 *	2,6-10, 13	
Y	* column 4, line 13 - line 26; figure 8 *		
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		5 October 2021	Kus, Slawomir
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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