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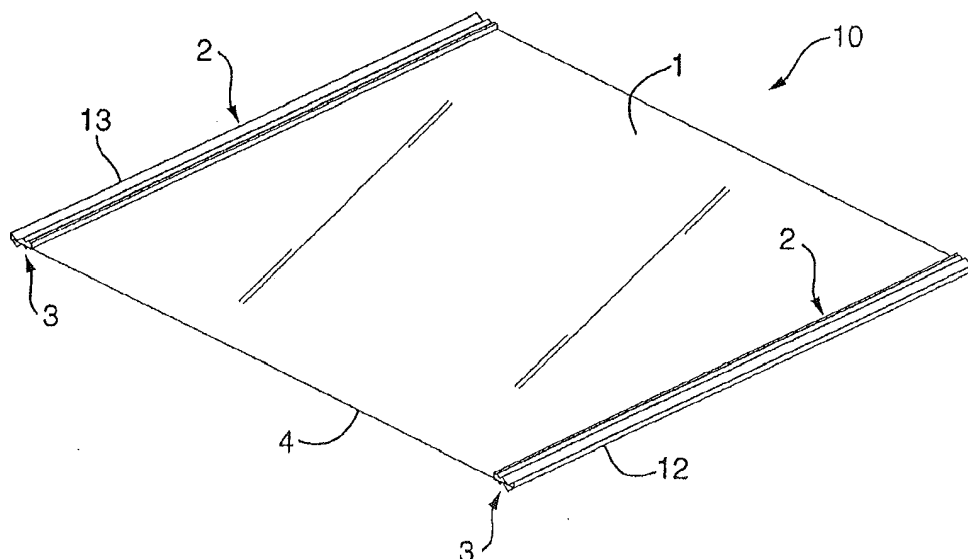
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(54) PROTECTION DEVICE

(57) The present invention relates to a protection device (10). The protection device comprises: a sheet (11); and a plurality of longitudinally extending sealing strips (2, 3) provided on the sheet. The opposed sides of each strip (2, 3) are provided with a sealing surface that is complimentary to the other sealing surface of the strip, such that one side of a strip can sealingly engage with

the other to form a seal when the protection device (10) is rolled up into a spiral. The plurality of strips (2, 3) are transversely spaced on the sheet (11) such that when the protection device is rolled up, the strips (2, 3) seal against themselves to form a pocket within the rolled sheet that is bound along longitudinal edges by a pair of transversely spaced seals.

Fig. 1



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Description

[0001] The invention relates to a protection device, more particularly, but not exclusively, a device for protecting a rolled product, a method of forming a protection device and a method of protecting a product using a protection device.

[0002] When a product is manufactured it is often desired to protect the product before it is further processed or used. Many products are produced in sheets and rolled up before being transported.

[0003] It can sometimes be desirable to prevent the rolled product from coming into contact with air and/or to protect the product from damage from impact during transit. It is therefore desirable to provide a protection device for protecting such rolled products.

[0004] In a first aspect, the present invention provides a protection device, the protection device comprising: a sheet; and a plurality of longitudinally extending sealing strips provided on the sheet, wherein opposed sides of each sealing strip are provided with a sealing surface that is complementary to the other sealing surface of the sealing strip, such that one side of a sealing strip can sealingly engage with the other to form a seal when the protection device is rolled up into a spiral, and wherein the plurality of sealing strips are transversely spaced on the sheet such that when the protection device is rolled up, the sealing strips each seal against themselves to form a pocket within the rolled sheet that is bound along longitudinal edges by a pair of transversely spaced seals.

[0005] This protection device is capable of providing a pocket which can accommodate and protect a rolled product.

[0006] By opposed surfaces it is meant that the surfaces are on opposite surfaces of the sealing strip such that the surfaces face in a direction away from each other. This means that when the sealing strip is overlapped on itself portions of each of the opposed surfaces may engage to form a seal.

[0007] In an embodiment, the protection device comprises: a sheet, a first longitudinally extending sealing strip, the first sealing strip being at a first location on the sheet; and a second longitudinally extending sealing strip, the second sealing strip being at a second location on the sheet which is transversely separated from the first location, wherein the first sealing strip has opposed complementary surfaces and the second sealing strip has opposed complementary surfaces such that the opposed surfaces of each sealing strip can sealingly engage with their respective opposed surfaces when each sealing strip is overlapped on itself.

[0008] The protection device may have been rolled up into a spiral such that a portion of the opposed complementary surfaces of each sealing strip engage to form a seal therebetween and to form a coiled pocket between the first and second transversely separated sealing strip.

[0009] In a second aspect the present invention provides a method of forming a protection device, the method

comprising: providing a sheet, the sheet having a plurality of longitudinally extending sealing strips thereon which are transversely spaced from each other on the sheet, wherein opposed sides of each sealing strip are provided with a sealing surface that is complementary to the other sealing surface of the strip, such that one side of a strip can sealingly engage with the other to form a seal when the protection device is rolled up into a spiral; and rolling the sheet into a spiral such that the sealing strips each seal against themselves to form a pocket within the rolled sheet that is bound along longitudinal edges by a pair of transversely spaced seals.

[0010] In a third aspect the present invention provides a method of protecting a product with a protection device, the method comprising: providing a sheet, the sheet having a plurality of longitudinally extending sealing strips thereon which are transversely spaced from each other on the sheet, wherein opposed sides of each sealing strip are provided with a sealing surface that is complementary to the other sealing surface of the strip, such that one side of a strip can sealingly engage with the other to form a seal when the protection device is rolled up into a spiral; providing the product on a surface of the sheet between two of the longitudinally extending sealing strips; and rolling up the sheet and the product into a spiral such that the sealing strips seal against themselves to form a pocket within the rolled sheet that is bound along longitudinal edges by a pair of transversely spaced seals and in which the product is located.

[0011] The present invention may provide a protection assembly, the protection assembly comprising a protection device, and a product, wherein the protection device comprises: a sheet; and a plurality of longitudinally extending sealing strips provided on the sheet, wherein opposed sides of each sealing strip are provided with a sealing surface that is complementary to the other sealing surface of the sealing strip so that one side of a sealing strip can sealingly engage with the other to form a seal, wherein the plurality of sealing strips are transversely spaced on the sheet, and wherein the product and protection device are rolled up together into a spiral such that the sealing strips each seal against themselves and form a pocket within the rolled sheet that is bound along longitudinal edges by a pair of transversely spaced seals and in which the rolled product is located.

[0012] The pocket may be a spiral such that the pocket may be able to protect a rolled product.

[0013] When the protection device is rolled up into a spiral, a portion of each sealing strip may engage on a radially inner surface to the radially outer surface of a radially inward located portion of the sealing strip and may engage on a radially outer surface to the radially inner surface of a radially outward located portion of the sealing strip. Thus a portion of the sealing strip may be engaged on both its inner and outer surfaces to other portions of the sealing strip.

[0014] When the protection device is rolled up into a spiral, each sealing strip may be engaged on its inner

and outer surfaces to other portions of the sealing strip other than on the innermost and outer most portions (i.e. the innermost turn and the outermost turn) of the sealing strip.

[0015] The sealing strip may therefore engage with itself to form a coiled side plate. In other words, each coiled sealing strip may provide a protection means.

[0016] The formed coiled side plate may be a substantially circular plate. The side plate may be located at or near the transverse side of the product being protected, i.e. the rolled edge of the product.

[0017] The sealing strips when rolled up can therefore provide protection to the edges of the rolled product.

[0018] The sealing strips may be formed of a resilient material. This is so the sealing strips when coiled up can provide protection to the edges of the product being coiled.

[0019] Thus the protection device may provide both a surface protector and an edge protector for a rolled product.

[0020] The pocket may extend (i.e. spiral) over at least 360 degrees, at least 540 degrees or at least 720 degrees, depending on the length of the product which is to be protected.

[0021] The pocket may extend over a number of revolutions around a central axis. For example there may be at least 2, 3, 4, 5, 10, 15, 20 or more revolutions around a central axis. The pocket may overlap itself one or more times.

[0022] The sheet and/or sealing strips may overlap themselves by at least 360 degrees, by at least 540 degrees or at least 720 degrees.

[0023] In a radial direction of the rolled up protection device there may be at least two, at least three or at least four or more layers of the sheet and/or sealing strips.

[0024] The pocket may extend in a continuous and gradually widening curve around a central point such that it overlaps itself.

[0025] Depending on the size (i.e. thickness and/or length) of the product which is to be protected by the protection device, the pocket may extend around a central axis over at least 0.1m, 0.5m, 1m, 5m, 10m etc.

[0026] The pocket may be bound on first and second surfaces by portions of the sheet and along its longitudinal edges by a pair of transversely spaced seals. The transverse edges may or may not be sealed.

[0027] The transverse edge of the sheet which is at the innermost part of the spiral when the protection device has been rolled up may be attached to a portion of the cover so as to provide a seal along the innermost transverse edge of the pocket.

[0028] The outermost transverse edge of the sheet may be attached to a portion of the cover so as to provide a seal along the outermost transverse edge of the pocket.

[0029] These inner and outer transverse seals may be formed by any known sealing means (such as adhesive or heat sealing etc) and/or they may be achieved by providing transversely extending sealing strips on the sheet.

[0030] A portion of the sheet may provide a boundary between two portions of the pocket. This may be the case when the pocket coils around itself.

[0031] The pocket may therefore be bounded on opposite faces by the sheet, bounded along each of its longitudinal edges by seals formed by engagement of the sealing strips and bounded along each of its transverse edges by seals, such as heat seals. Once sealed, the pocket may provide an airtight volume in which a rolled product is, or can be, located.

[0032] When the sheet and sealing strips are formed of a waterproof material, the pocket may provide a watertight volume in which a rolled product is, or can be, located.

[0033] One of the longitudinally extending sealing strips may be provided at or near a longitudinal edge of the sheet and another longitudinally extending sealing strip may be provided at or near the other longitudinal edge of the sheet. There may also be one or more longitudinal extending sealing strips located on the strip remote from the longitudinal edges of the sheet, i.e. towards the middle of the sheet.

[0034] Each sealing strip may engage with itself to form a seal when the sealing strip is overlapped on itself.

[0035] The sheet may be an elongate length of flexible material. The length (i.e. a dimension in the direction in which the sealing strips extend) may be greater than the width (i.e. a dimension in the direction perpendicular to that in which the sealing strips extend) of the sheet. For example, the length may be at least two times, three times, four times, five times or ten times or more than the width of the sheet. Although it will be understood that the dimensions will depend on the dimensions of the product to be protected by the protection device.

[0036] The thickness (i.e. dimension in a direction perpendicular to the plane of the sheet) of the seal formed by each of the sealing strips may be equal to or greater than the thickness of the product to be protected by the protection device.

[0037] The thickness of the seal formed by two complementary sealing surfaces of the sealing strip (i.e. the distance between two adjacent portions of the sheet when the protection device is rolled up) may be approximately (i.e. within 10% or within 5%) the same as the thickness of the product.

[0038] The sheet may be a thin, deformable, flexible, robust and/or waterproof sheet. The sheet may for example comprise a plastic film, a paper layer and/or a foil sheet. The sheet may comprise a fabric or woven material. The sheet may comprise one or more layers, i.e. the sheet may be a laminate of a plurality of layers which may each be different materials. For example the sheet may be a fabric layer sandwiched between two polymer layers.

[0039] The sheet may be formed from a lightweight, water resistant and/or flexible material such as a synthetic polymer.

[0040] The sheet may be cast or may be a blown film

extrusion or it may be manufactured by any other known suitable manufacturing method.

[0041] The sheet and/or sealing strips may comprise one or more chemicals to help protect the product which is to be protected by the protection device.

[0042] The chemicals may be, but are not limited to, inhibitors such as anti-microbial, anti-static, and/or anti-corrosive inhibitors depending on the product to be protected by the device.

[0043] These chemicals may be applied by any known method (such as printing, spraying or coating) onto the sheet or sealing strips. Alternatively or additionally, one or more of the chemicals may be present in the material of the sheet and/or sealing strips itself. For example, if these are made of a polymer material the chemicals may be incorporated into the material itself, for example the chemicals may be incorporated in a polymer mix or provided as a polymer additive.

[0044] A hydrochromic means may be provided in, or on, the sheet. For example, the hydrochromic means may be provided on the inside face of the sheet i.e. the face which, in use, is adjacent to product to be protected, so as to indicate the presence of water underneath the sheet. This may be useful when it is necessary or desirable to keep the product free of water or above or below a particular humidity level.

[0045] The hydrochromic means may be hydrochromic ink located on the inner face of the sheet, which changes its visual appearance in response to water by changing colour. This means that the protection device may be capable of revealing if water has entered the pocket.

[0046] The protection device may be mounted on and may be extendable from a reel or spool and optionally provided with a housing which may provide a cutting or cropping means when a desired length of device has been achieved from, i.e. wound off, the spool.

[0047] The sealing strips may extend parallel to each other.

[0048] At least one of sealing strips may be arranged to permit connection over an offset overlap, wherein the sealing strips may be able to cooperate to form a seal at angles which deviate to a certain extent from a parallel direction. In other words, sealing strips may be arranged so that the seal may be formed even if the sealing strips are mated when at an angle offset relative to each other, e.g. by up to 5 or 10 degrees.

[0049] The protection device may comprise three or more longitudinally extending sealing strips. This means that a plurality of pockets can be formed when the protection device is rolled up. In this case, a single sealing strip may form the longitudinal boundary between two pockets.

[0050] Each sealing strip may comprise a female sealing surface and a male sealing surface. When the sealing strip is rolled up on itself the male sealing surface may be received by, and engage with, the female sealing surface.

[0051] The sealing surfaces of the sealing strips may

include a surface that is serrated or undulating in a transverse direction. Each sealing strip may thus comprise a first serrated or undulating surface and a second serrated or undulating surface which when placed together form a mating pair and a seal.

[0052] The sealing strips each have complementary opposed surfaces. This means that a first sealing surface of each sealing strip may have a profile which can be received in the other sealing surface of the sealing strip. This allows one surface of the sealing strip to create a seal by engagement with the opposed surface of that sealing strip.

[0053] A first sealing surface of each sealing strip may comprise at least one longitudinally extending peak and the other, a second, sealing surface of the sealing strip may comprise a corresponding longitudinally extending trough. When the sealing strips each comprise at least one longitudinally extending peak and at least one longitudinally extending trough, these form the longitudinally extending serrations or undulations.

[0054] When the protection device is rolled up, a portion of the at least one longitudinally extending peak may be received in a portion of the corresponding longitudinally extending trough of the sealing strip. This means that a seal can be created between the overlapping portions of each sealing strip. In other words, each sealing strip may be capable of mating with itself to form a seal.

[0055] Each sealing strip may comprise any number of longitudinally extending peaks on one surface and the same number of corresponding longitudinally extending troughs on the other surface.

[0056] When the sealing strip comprises more than one longitudinally extending peak and corresponding longitudinally extending trough, each longitudinally extending peak and corresponding trough may be of a different size to the other peaks and troughs.

[0057] The height of the peaks and the depth of the corresponding troughs may gradually decrease in size away from the outer lateral side of the sealing strip, i.e. the peaks and troughs nearest the centre of the sheet (and/or another sealing strip) may have the smallest height and depth. This permits a reliable seal to be formed.

[0058] At least one of the longitudinally extending troughs may comprise a longitudinally extending lacuna and the corresponding longitudinally extending peak may comprise longitudinally extending nub (or vice versa). With such an arrangement, in use, a portion of the nub may be received in the lacuna to thereby hold the overlapping sealing strip together, i.e. thereby providing a locking means.

[0059] The sealing strip may be formed from a resiliently deformable, flexible polymer which may have adhesive properties.

[0060] The sealing strip may be formed from a thermoplastic elastomer (TPE).

[0061] The sealing strips may each comprise two different materials, these may, for example, be two different

thermoplastic elastomers and these may have been co-extruded to form the sealing strip. For example, the sealing strip may comprise a relatively (compared to the other layer) rigid layer and a more flexible layer. The sealing/engagement surfaces of each sealing strip, for example, if present, the serrations or undulations of the sealing strip, may be formed of the more flexible layer.

[0062] Additionally, if the sealing strip comprises a locking means (e.g. a longitudinal nub and lacuna), this portion of the sealing strip may be formed from the more flexible material. This may mean the locking means can be more resilient to being pulled apart.

[0063] The sheet with the longitudinally extending sealing strips may be formed as a single piece, for example by moulding or extrusion.

[0064] Alternatively, the sheet and the sealing strips may be formed separately and then joined together.

[0065] Each sealing strip may be extruded as one part. The extrusion may comprise a flat base on one side and the two complementary sealing surfaces (such as a one or more serrations or undulations) on the other side of the extrusion to the flat base. Such a sealing strip may be folded and secured around the sheet. When the extruded seal section is folded around the sheet, such as at an edge, it may form two complementary surfaces which, in use, can be mated together to form a seal.

[0066] The sealing strip may alternatively be extruded as one part and cut into the two complementary surfaces or the two seal surfaces may be made separately.

[0067] The extruded sealing strips, if extruded as one part, may include a central recess (in the flat base) for receiving the sheet. The sealing strips may each be folded around the sheet at the recess (i.e. the recess may also act as a hinge) so that the flat base is in contact with both faces of the sheet.

[0068] The sealing strips may be attached to the sheet by any known means such as welding or adhesive etc.

[0069] When the sealing strips are extruded, the cross-sectional shape of the sealing strips will be constant along its length.

[0070] This means that a protection device may be used to roll a continuum of different lengths. This is because the protection device can overlap itself by any length whilst still being capable of forming a seal.

[0071] When the sealing strips are extruded they may each be coextruded. This means that the sealing strips can comprise two different materials which may have different properties. When the sealing strips are extruded as one part with a flat base and a plurality of serrations or undulations it may be coextruded. This means that the base layer which is in contact with the cover when folded around the cover may be more rigid and the serrations and undulations may be more flexible.

[0072] The sealing strips and/or the sheet may have elastic properties. This means that, for example, the device may be stretched out of shape to accommodate different sized products, and may further aid in permitting offset connection of the complementary sealing surfaces.

[0073] In some embodiments at least one of the sealing strips may include an adhesive (for example a liquid or heat activated adhesive) which will permit the sealing strip to be affixed to itself when it becomes wet, warm or hot.

[0074] The protection device may be arranged so that, once the sealing strip has been used to form a mating pair, the sealing strip may be disengaged by pulling the overlapping portions of the sealing strips apart. The protection device may be reused or alternatively may be a one-use, disposable item.

[0075] The seal may be a permanent seal. In this case, once it is desired to remove a product being protected from the protection device it may be necessary to do so by cutting through the sheet so that the product can be removed from the protection device.

[0076] The product may be any product which can be rolled. For example, the product may be a sheet of steel, paper, graphene, plastic or food, such as pastry. This is just a small list of the possible products which can be protected using the protection device and is intended to illustrate the broad range of products to which this protection device can be applied. The product may be an industrially manufactured product.

[0077] The product may be in the form of a sheet, i.e. where the thickness is significantly less, or even negligible, compared to the length and/or width of the product.

[0078] The protection device may be formed by providing the sheet, providing the sealing strips (which may be extruded) and attaching the sealing strips to the sheet.

[0079] If the sealing strip is extruded, each extruded sealing strip may be one part with a flat base and the two complementary sealing surfaces. In this case, the sealing strips may be attached to the sheet by folding and securing one of the extruded seal sections to each side of the sheet so that the flat base is in contact with both surfaces of the sheet.

[0080] The product may be laid onto the sheet of the protection device between two of the sealing strips and the protection device may then be rolled so the sealing strips each seal against themselves to form a pocket around the product.

[0081] This process may occur for example at a production site of the product. The product may be being produced in sheets which are laid directly from the production machine onto the protection device and then rolled with the protection device to form a pocket and side plates which protects the product.

[0082] Once the protection device is rolled up into a spiral with the product therein, in a radial direction there will be alternating layers of sheet and product.

[0083] The sheet may therefore prevent subsequent rolls of the product coming into contact with itself.

[0084] The protection device may be rolled up on itself by at least one revolution so that each sealing strip can sealingly engage itself over at least a small portion before the product is laid onto the sheet.

[0085] A portion of the sheet at, or near, its innermost

transverse edge may be sealed (such as by heat sealing or adhesive) to a portion of the cover further from the innermost transverse edge to form an inner transverse seal. This inner transverse seal may extend the entire distance between two sealing strips so as to form a seal at the innermost transverse edge of the pocket which will be formed when the device is rolled around itself further.

[0086] This may result in a central tube (which does not necessarily have a circular cross section) around which the rest of the protection device (and product) is wrapped.

[0087] The protection device may thus provide a packaging for a rolled product.

[0088] As an example, a product such as a roll of stainless steel or wallpaper, may be rolled into a spiral with the protection device. The rolled product within the protection device may then be transported to a location for further processing or on to a retailer for the product within the protection device to be purchased by a consumer.

[0089] The protection device may protect the product from damage during transit. This may be protection from surface or edge damage. The damage may be electrical damage (which may be prevented or minimised by anti-static properties of the protection device), rust or other types of corrosion (which may be prevented or minimised by anti-corrosive properties of the protection device and due to protection from water and moisture), damage caused by bacteria (which may be prevented or minimised by anti-microbial properties of the protection device) and damage caused by physical interactions such as scratches, dust, finger marks etc.

[0090] In its broadest aspect the present invention provides a protection device, the protection device comprising: a sheet; and a plurality of longitudinally extending sealing strips provided on the sheet, wherein opposed sides of each sealing strip are provided with a sealing surface that is complementary to the other sealing surface of the sealing strip, such that one side of a sealing strip can sealingly engage with the other to form a seal when the sealing strip overlaps itself.

[0091] This aspect of the invention may have one or more of the features or optional features described above.

[0092] Certain preferred embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings, in which:

Figure 1 shows an isometric view of an embodiment of the device before use;

Figure 2 shows a detail side view of a seal section from the embodiment shown in Figure 1;

Figure 3 shows a view from above of the embodiment shown in Figure 1;

Figure 4 shows a side view of the embodiment shown in Figure 1;

Figure 5a shows a schematic front view of a product located on a protection;

Figure 5b shows a schematic side view of a rolled

up protection device;

Figure 5c shows a schematic cross-section of a product in a protection device; and

Figures 6a to d show a seal section, in lateral cross section, being attached to a cover.

[0093] With reference to the figures the protection device 10 comprises a sheet 11 with a first face 1 and a second face 4. The sheet has peripheral, sealing strips 12, 13 which each have a first sealing surface 2 and a second sealing surface 3. The first sealing surface 2 of each of the sealing strips is arranged to engage with a second sealing 3 of that respective peripheral sealing strip, to make a seal.

[0094] One or both of the faces 1 or 4 may include anti-static, anti-corrosive and/or anti-microbial chemicals on the surface. Both faces 1, 4 may comprise these chemicals as both surfaces may come into contact with a product during use.

[0095] In an embodiment, the sheet 11 thickness is no greater than 0.5mm, and preferably no greater than 2mm, so as to be easily stowed and to be flexible in use.

[0096] The sealing strip 12, 13 width (i.e. the transverse dimension) is at least 5mm, preferably 5-100mm. However, the desired size will depend on a number of factors such as the size of the product to be protected and how reliable the seal needs to be etc.

[0097] Preferably the thickness of the seal formed by two complementary sealing surfaces of the sealing strip is approximately (i.e. within 10% and within 5%) of the thickness of the product. This is so the distance between the two parts of the sheets which bound the pocket is similar to the thickness of the product being protected. This is so that a reliable seal can be provided whilst minimising the extra size of the roll caused by the protection device.

[0098] In this embodiment the sealing strips 12, 13, each comprise serrations, or undulations (although these are not shown in the schematic of Figure 5a). The serrations, or undulations, in preferred embodiments have the relative dimensions shown in Figure 2, wherein a relatively larger trough 7 corresponds with an undulation or serration 8. A series of relatively smaller troughs and peaks follow subsequently, wherein the next trough contains a lacuna 6 corresponding to a nub 5 on the corresponding peak.

[0099] The seal section 13 in the embodiment shown in lateral cross section in Figure 2 comprises three longitudinally extending peaks on one surface 3 of the seal section and three corresponding longitudinally extending troughs on the other, opposed, surface 2 of the seal section 13. The seal section 13 may comprise any number of corresponding longitudinally extending peaks or troughs.

[0100] Figures 6a to 6d show the process of attaching one of the sealing strips 12, 13 to the flexible sheet 11. Figure 5a shows a lateral cross-section of the extruded sealing strip 12, 13. The sealing strip is extruded as a

single piece which comprises a complementary first and second surfaces 2, 3. As a result of the sealing strip 12, 13 being extruded the cross-sectional shape is constant along its length. Half way along the cross-section of the sealing strip a thin, v-shaped portion 14 (see Figure 5d) is provided. This v-shaped section 14 acts as a hinge about which the sealing strip 12, 13 can be folded. Additionally, the v-shaped section provides a recess for receiving an edge of the flexible sheet 11.

[0101] To attach the sealing strip 12, 13 to the flexible sheet 11, the sheet is received in the v-shaped recess 14 and the sealing strip is folded about the v-shaped section so that a flat base of the extruded sealing strip 12, 13 is in contact with the opposed faces of the sheet 11 along one side (as shown in Figures 5b and 5c). Once folded about the sheet 11 the sealing strip 12, 13 may be secured onto the sheet by welding, adhesive or another known attachment means.

[0102] Alternatively each of the complementary surfaces 2, 3 of a sealing strip may be made separately and then attached to opposite sides of the sheet 11. This means that the sealing strip does not have to be limited to being at an edge of the sheet.

[0103] In use, as shown in Figure 5a a product 15 in the form of a sheet is placed onto sheet 11 of the protection device between transversely separated sealing strips 12, 13.

[0104] The protection device 10 and the product 15 may then be rolled up together in to a spiral form. As the protection device 10 is rolled up the sealing strips 12, 13 overlap themselves and the opposite complementary sealing surfaces 2, 3 can mate to form a longitudinally extending coiled seal.

[0105] A schematic of a side on view of a rolled up protection device 10 is shown in Figure 5b. For clarity the sheet 11 is shown in a solid line and the sealing strip 12 is shown in dashed lines.

[0106] This Figure shows how the sealing strip 12 engages itself in the coil to form a continuous seal. This seal provides a longitudinal edge of a pocket in which the product 15 is housed as it is rolled up with the protection device.

[0107] The rolled up sealing strip 12 forms a side plate which can help protect the rolled up edges of the product 15 housed within the pocket of the protection device 10.

[0108] Thus when a product 15 is rolled up in the protection device 10, the protection device 10 can provide both surface and edge protection to the product 15.

[0109] Figure 5c shows a schematic cross section of a product 15 coiled up in the protection device.

[0110] The radially inner transverse edge of the sheet 11 is connected to another, more radially outward portion of the sheet 11, and the radially outer transverse edge of the sheet 11 is connected to another, more radially inward portion of the sheet so as to form a sealed pocket 16.

[0111] The product 15 is protected within the sealed pocket 16. The sheet 11 interleaves the product 15 so

as provide a barrier between subsequent rolls of the product 15.

[0112] These schematics are to help illustrate the concept of the present invention and are not intended to illustrate what the actual protection device would look like.

[0113] The invention has been described by way of example only and it will be appreciated that variations may be made to the above-mentioned embodiments without departing from the scope of invention, which is defined by the appended claims.

Claims

1. A protection device, the protection device comprising:

a sheet; and

a plurality of longitudinally extending sealing strips provided on the sheet, wherein opposed sides of each sealing strip are provided with a sealing surface that is complementary to the other sealing surface of the sealing strip, such that one side of a sealing strip can sealingly engage with the other to form a seal when the protection device is rolled up into a spiral, and

wherein the plurality of sealing strips are transversely spaced on the sheet such that when the protection device is rolled up, the sealing strips each seal against themselves to form a pocket within the rolled sheet that is bound along longitudinal edges by a pair of transversely spaced seals.

2. A protection device according to claim 1, wherein the protection device has been rolled up into a spiral such that a portion of the opposed complementary sealing surfaces of each sealing strip engage to form a seal therebetween and to form a coiled pocket within the rolled sheet that is bound along longitudinal edges by the pair of transversely spaced seals.

3. A protection device according to claim 2, wherein the each sealing strip engages with itself to form a coiled side plate for providing protection to the edges of the product to be protected by the protection device, and/or wherein each sealing strip overlaps itself by at least 360 degrees.

4. A protection device according to claim 2 or 3, wherein the pocket is bound on first and second surfaces by portions of the sheet.

5. A protection device according to claim 4, wherein the transverse edge of the sheet which is at the innermost part of the spiral is attached to a portion of the cover so as to provide a seal along the innermost

transverse edge of the pocket, and/or wherein the outermost transverse edge of the sheet is attached to a portion of the cover so as to provide a seal along the outermost transverse edge of the pocket.

- 5
6. A protection device according to any of claims 2 to 5, wherein a portion of the sheet provides a boundary between two portions of the pocket.
7. A protection device according to any preceding claim, wherein the sheet is an elongate length of flexible material. 10
8. A protection device according to any preceding claim, wherein the thickness of the seal formed by two complementary sealing surfaces of the sealing strip is approximately the same as the thickness of the product to be protected by the device. 15
9. A protection device according to any preceding claim, wherein the sheet and/or sealing strips comprise one or more chemicals to help protect the product which is to be protected by the protection device. 20
10. A protection device according to any preceding claim, wherein the two complementary sealing surfaces of each sealing strip are a female sealing surface and a male sealing surface, wherein the female sealing surface preferably comprises a plurality of troughs and the male sealing surface comprises a plurality of corresponding peaks. 25 30
11. A protection device according to any preceding claim, wherein each sealing strip is an extrusion as one part with a flat base and a plurality of serrations or undulations, and wherein the each sealing strip has been formed by folding and securing the extrusion around the longitudinal sides of the sheet so that the flat base is in contact with both surfaces of the sheet. 35 40
12. A device according to any preceding claim, wherein each sealing strip comprises a locking means.
13. A protection assembly, the protection assembly comprising: 45
 - a protection device according to any preceding claim; and
 - a product, 50
 - wherein the product and protection device are rolled up together into a spiral such that the sealing strips each seal against themselves and form the pocket in which the rolled product is located. 55
14. A method of forming a protection device, the method comprising:

providing a sheet, the sheet having a plurality of longitudinally extending sealing strips thereon which are transversely spaced from each other on the sheet, wherein opposed sides of each sealing strip are provided with a sealing surface that is complementary to the other sealing surface of the strip, such that one side of a strip can sealingly engage with the other to form a seal when the protection device is rolled up into a spiral; and
 rolling the sheet into a spiral such that the sealing strips each seal against themselves to form a pocket within the sheet that is bound along longitudinal edges by a pair of transversely spaced seals.

15. A method of protecting a product with a protection device, the method comprising:

providing a sheet, the sheet having a plurality of longitudinally extending sealing strips thereon which are transversely spaced from each other on the sheet, wherein opposed sides of each sealing strip are provided with a sealing surface that is complementary to the other sealing surface of the strip, such that one side of a strip can sealingly engage with the other to form a seal when the protection device is rolled up into a spiral;
 providing the product on a surface of the sheet between two of the longitudinally extending sealing strips; and
 rolling up the sheet and the product into a spiral such that the sealing strips seal against themselves to form a pocket within the sheet that is bound along longitudinal edges by a pair of transversely spaced seals and in which the product is located.

Fig. 1

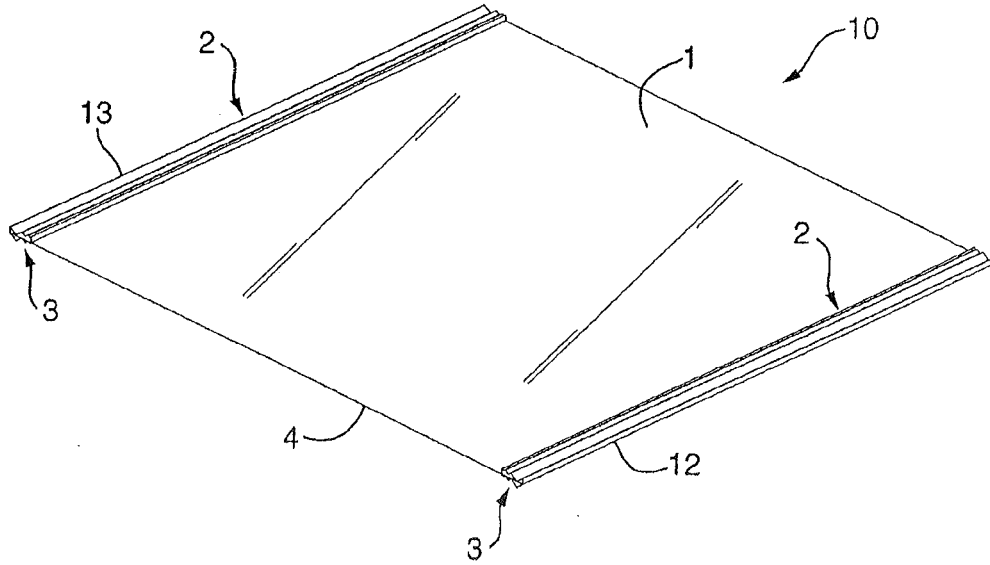


Fig. 2

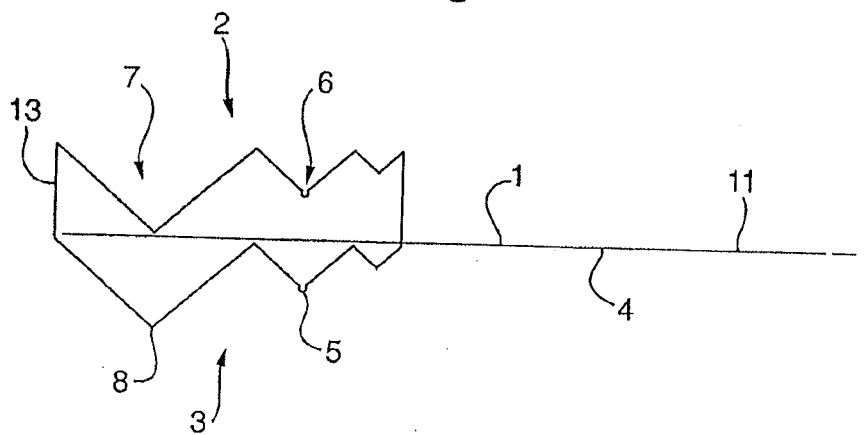


Fig. 3

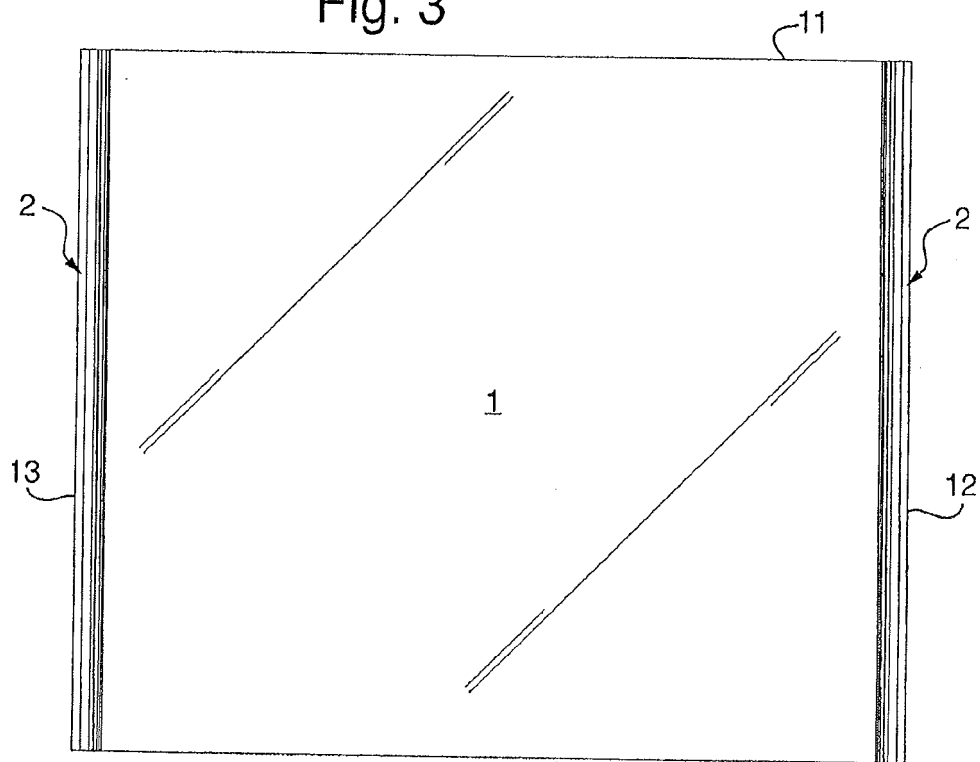
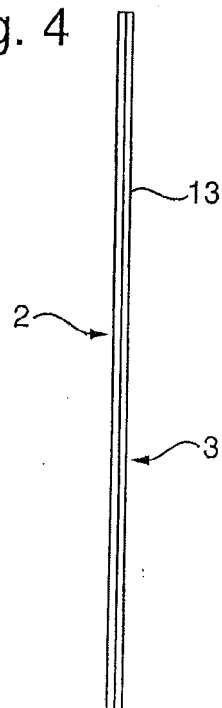


Fig. 4



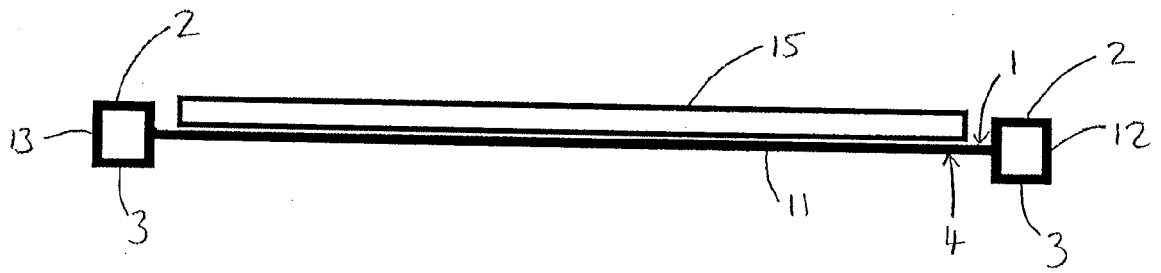


Fig. 5a

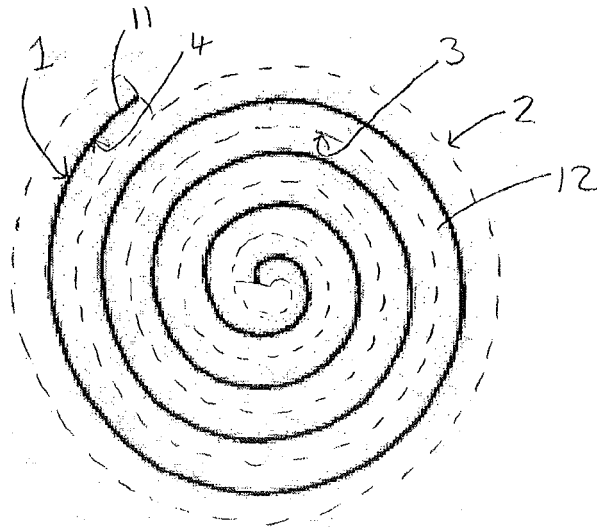


Fig. 5b

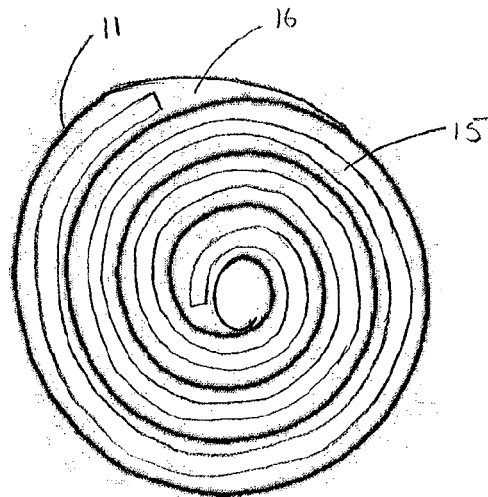


Fig. 5c

Fig. 6a

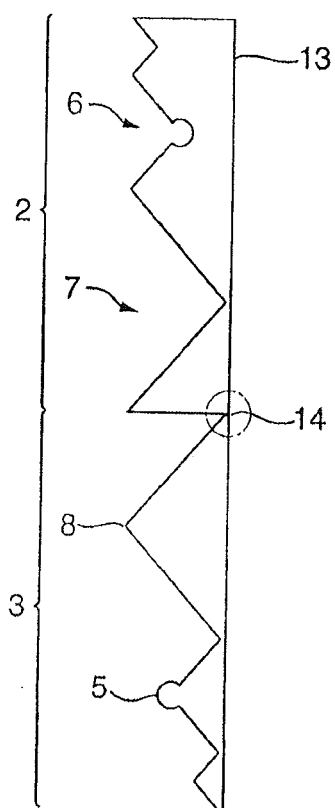


Fig. 6b

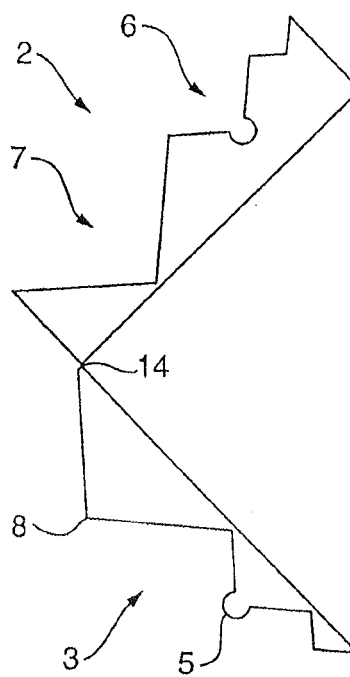


Fig. 6c

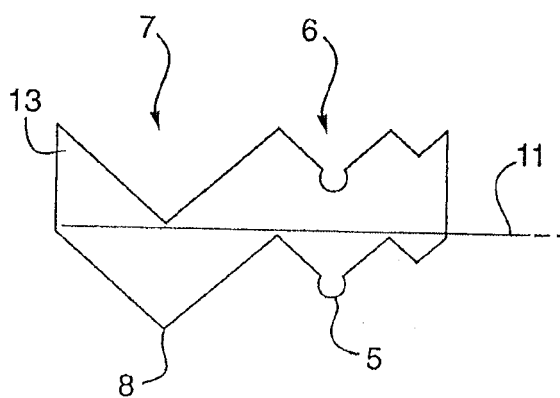
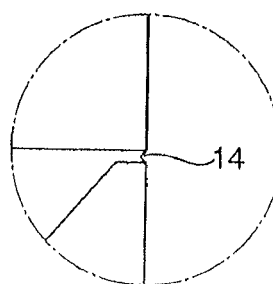


Fig. 6d





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Application Number
EP 15 17 7956

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			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		1 December 2015	Jervelund, Niels
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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The members are as contained in the European Patent Office EDP file on
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