

Packing unit, shipping unit and a method of manufacturing a packing unit

Technical Field

5 The present invention relates to a packing unit comprising a group of packages filled with a liquid product which are of the collapsible type and comprise a bottom wall and two opposite side walls, which packages in their upright position have an upwardly tapering shape.

10 The invention further relates to a method of manufacturing the packing unit and a shipping unit comprising packing units of the kind stated by way of introduction.

Background Art

15 In the food industry it is common for packages that hold liquid foodstuffs to be packed in boxes for further distribution or storage.

20 Traditional packages used in the food industry are made of rigid packing materials such as paperboard. Packages of this kind can be manufactured with a shape such that they are stackable, for example, and capable of carrying a load. This means that they can be easily packed in larger units by arranging them side-by-side and on top of each other, for example on a pallet or in a cardboard box for further transport.

25 Packages of the collapsible type are becoming widely used in the food industry and other industries. Such packages are made of a flexible plastic film material, which means that the packages do not have the same rigid quality as the package type discussed above.

30 It is a problem that collapsible packages cannot be stacked one over another, for example prior to transport. And so, a number of collapsible packages are often packed together in a cardboard box. When transporting such boxes vibrations and forces acting on the packages during transport can cause wear to the packages. In some cases such wear, especially in combination with the

formation of folds in the packaging material, can cause leakage of the package contents.

European Patent Application No EP 0 681 970 discloses a method of folding
5 collapsible packages to make them stackable one over another.

Summary of the invention

It is an object of the present invention to make available a packing unit that is suitable for storing and transporting of collapsible packages. A further object
10 of the present invention is to make available a method of manufacturing packing units that are suitable for storing and transporting of collapsible packages. It is also an object of the present invention to make available a shipping unit comprising a plurality of packing units which is suitable for storing and transporting of collapsible packages.

15 According to a first aspect, the present invention relates to a packing unit comprising a group of packages filled with a liquid product which are of the collapsible type and comprise a bottom wall and two opposite side walls, which packages in their upright position have an upwardly tapering shape,
20 characterised in that the packages are so arranged that each package has a side wall facing a bottom of the packing unit, the packages are stacked one over another in a plurality of layers with a plurality of packages in each layer, said packages having an alternating orientation in a first direction and a second direction opposite to the first direction and the packages of an
25 individual layer having a uniform orientation in the first or the second direction, and a plastic film cover which at least partly surrounds the group of packages for providing dimensional stability to the packing unit, the plastic film cover being made of a web of a plastic film material which has been joined together along four or fewer elongate sealing portions for forming said
30 plastic film cover.

By packages of the collapsible type is meant, for example, packages which have a chamber defined by flexible walls, which walls are joined together along a connecting portion. Such packages can have the advantages of low
35 weight, of allowing efficient production thereof and, in their non-filled state, of taking up less space in their than corresponding packages made of rigid packaging material.

By virtue of the fact that the packages are so arranged that each package has a side wall facing a bottom of the package unit it is possible, for example, for the packages to be placed in a stable manner on a surface. Moreover, the
5 packing unit can be made with a large base surface, which may enable the packing unit to be placed in a stable manner on a surface, the side walls of the packages being substantially parallel to said surface.

Said plurality of layers is at least two layers, for example 2, 3, 4, 5, 6, 7, 8 or
10 more layers. Said plurality of layers can be at least two layers and an even number of layers, for example 2, 4, 6, 8 or more. Said plurality of layers can enable for example packing in such manner that the packing unit assumes the shape of a right parallelepiped. As a result, rational stacking of the packing unit is made possible.

15 A plurality of packages in each layer can be for example 2, 3, 4, 5, 6, 7, 8 or more packages in each layer. By arranging a plurality of packages in each layer the packing unit can be made with a large base surface, which may allow the packing unit to be placed in a stable manner on a surface.
20 Said plurality of packages in each layer can be two or more packages in each layer.

By virtue of the fact that the packages have an alternating orientation in a first direction and a second direction opposite to the first direction and that the
25 packages of an individual layer have a uniform orientation in the first or the second direction, or that the packages are arranged head to foot, the packages can be tightly packed and packed in such a manner that the packing unit assumes essentially the shape of a right parallelepiped, which shape can be desirable for storage and/or transport.

30 The plastic film cover, which at least partly surrounds the packages, is arranged such that dimensional stability of the packing unit is achieved. It is a considerable advantage that packing units comprising packages of the collapsible type can be dimensionally stable. Such dimensionally stable
35 packing units can for example be adapted to carry a load, which means, for instance, that the packages can be stacked. A plurality of packing units can be stacked for example on a pallet, which enables easy handling and

transport not only of a plurality of packages but also of a plurality of packing units. Moreover, owing to the plastic cover that at least partly surrounds them and despite the shaking and vibrations that may occur for example during transport, the packages will not rub against each other or will rub against each other considerably less than during transport of conventional packing units. As a result the risk that the packages are damaged and that leakage should occur is reduced. When packages of the collapsible type are packed together in boxes, for example, folds may occur in the flexible walls of the packages, which folds aggravate any damage related to wear to the wall of the package caused by a rubbing effect during transport. Fold problems of this kind are minimised by the invention. Accordingly, the invention solves a number of problems relating to the transport of packages of the collapsible type.

15 The fact that the plastic film cover is made of a web of plastic film material which has been joined together along four or fewer elongate sealing portions, or longitudinal seals, for forming said plastic film cover may enable, for instance, a rational production of the plastic film cover.

20 Said longitudinal seals have a component in the longitudinal direction of the plastic film.

The seals, longitudinal and/or transverse, according to the invention can be flexible and/or bendable. Said flexible and/or bendable sealing portions can help to reduce or minimize the risk that the packages are damaged and that package leakage occurs.

The packing unit according to the invention can comprise a handle. A handle on the packing unit can be a considerable advantage when the individual packing units are to be transported by carrying them in your hand. The packing unit can for example consist of a number of packages, each with a certain volume, such that the packing unit according to the invention is suitable for easy transport of for example beverages by a customer who has bought the packing unit in a shop. A packing unit containing for example between 1 and 24 packages, each with a liquid volume of, for example, between 10 and 200 centilitres, can be carried in this manner.

The packages can comprise or be made of for example plastic, paper, laminated materials, or combinations thereof.

The number of packages in each layer of the packing unit can be identical.

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The group of packages can contain, for example, four, six, eight or ten packages.

10 The plastic film cover can surround the packing unit in such a way that each individual package has a fixed position in the unit. In this way, the plastic film cover can ensure that the packages of the group of packages maintain their relative positions also, for example, during transport or when subjected to a load.

15 The plastic film cover can surround the group of packages completely. In this way, the group of packages can be protected from all sides and improved dimensional stability can be obtained, regardless of the direction of the load to which the group is subjected. The group of packages can for example have six faces, all of which are surrounded by said plastic film cover. The group of
20 packages, and also the packing unit, can thus form for example a right parallelepiped, which is a suitable geometry for packing units, since a plurality of such packing units can be tightly packed, thereby taking up very little storage and cargo space. Fewer than all the sides of the group of packages can be surrounded by the plastic film cover, for example five or four sides. At
25 least four sides of the packing unit should be surrounded by the plastic film cover in order to provide the dimensional stability according to the invention.

The packing unit can have four or fewer transverse sealing portions, or transverse seals, for example three or fewer transverse seals.

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Said transverse seals have a component across the longitudinal direction of the plastic film.

35 Different combinations of the number of longitudinal and transverse seals can be used in the packing unit. The packing unit can for example have four or fewer longitudinal seals and four or fewer transverse seals.

The plastic film cover can for example have one longitudinal and two transverse seals. Thus, the plastic film cover can be a piece of plastic film that is sealed around the group of packages, permitting efficient application of the plastic film cover.

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The plastic film cover can for example have two longitudinal and two transverse seals.

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According to the invention the seals can be positioned on the sides of the packing unit.

The seals may be positioned on the sides of the packing unit and on three or fewer edges of the packing unit.

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The seals may be positioned on the sides of the packing unit and not on the edges of the packing unit.

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By dimensional stability according to the invention is meant that the plastic film cover should surround the group of packages in such a manner that the individual packages are held in a substantially fixed position relative to each other. Dimensional stability according to the invention can also be achieved when the packing unit is subjected to a load, since the group of packages are surrounded by a plastic film cover.

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The plastic film cover can surround the group of packages completely without a tightening force. The plastic film can for example be so arranged to loosely surround the group of packages while at the same time provide dimension stability to the packing unit. The loosely surrounding plastic film does in this case not absolutely fix the individual package in its position, but ensures that the package may be moved slightly in relation to the rest of the packages in the group. However, dimension stability is none the less provided as the plastic film prevents the individual package from falling out from the packing unit. When the packing unit is subjected to a load, displacement of the packages may occur but the plastic film still prevents fallout of packages.

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Thus, a plastic film cover of this kind can provide dimensional stability to the packages .

The plastic film cover can also surround the group of packages with a tightening force. Thus, a plastic film cover of this kind can provide dimensional stability to the packages

- 5 The plastic film cover of the packing unit can be arranged to surround the packages with a tightening force such that the contents of the packages form back-pressure beams to accomplish said dimensional stability of the packing unit.
- 10 The plastic film cover of the packing unit can be for example a shrink film. A shrink film can be positioned in a desirable and suitable manner around the packages and subsequently be allowed to shrink, for example by means of heating, in order to enclose even more tightly the packing unit and, where desirable, to generate tightening forces.
- 15 The plastic film cover of the packing unit can be for example a film wrap. Film wrapping is an effective way of applying a cover around the packages. Furthermore, wrapping allows a tension to be created in the cover, such that dimensional stability can be obtained in the packing unit according to the
- 20 invention.
- The plastic film cover of the packing unit can be a film wrap in the form of a shrink film.
- 25 The plastic film cover of the package can be a film wrap which has been provided with transverse and/or longitudinal seals.
- The plastic film cover of the packing unit can comprise or be made of, for example, thermosetting plastics or resins, or other polymer materials that are
- 30 suitable according to the invention.
- The plastic film cover of the packing unit can have a thickness of less than 100 micrometers, but can also be thicker than one hundred micrometers. The plastic film cover can for example have a thickness of 5-50 or
- 35 10-30 micrometers.

The shipping unit according to the invention can comprise a plurality of packing units. It may be advantageous when transporting the packing units to handle several packing units as one shipping unit. Lifting, or other handling operations, can be minimized, for example, if several packing units are
5 handled as one unit. A shipping unit can also comprise, for instance, a suitable number of packing units for distribution to and storage at shops.

The packing units of the shipping unit can be stacked on a load carrier. A load carrier that carries the shipping unit can, for example, facilitate the handling
10 and transport of the shipping unit and the packing units. The load carrier can for example be arranged for lifting and loading or for transport by means of a truck, such as a fork-lift truck or a hand-driven truck.

The packing units of the shipping unit can be arranged in a stack, which stack
15 is at least partly surrounded by a plastic film cover. A plastic film cover of this kind can for example hold the packing units together and steady them during transport. Furthermore, the plastic film cover can secure the packing units to the load carrier, in those cases where the packing units are stacked on a load carrier. The plastic film cover can be for example a film wrap, which film wrap
20 can be a shrink film.

According to a second aspect, the present invention relates to a method of manufacturing packing units, comprising the steps of arranging a group of packages filled with a liquid product which are of the collapsible type and
25 comprise a bottom wall and two opposite side walls, which packages in their upright position have an upwardly tapering shape, stacked one over another in a plurality of layers with a plurality of packages in each layer such that the packages have an alternating orientation in a first direction and a second direction opposite to the first direction, the packages of an individual layer
30 having a uniform orientation in the first or the second direction and the packages being arranged such that each package has a side wall facing a bottom of the packing unit, at least partly surrounding the packages with a plastic film cover and providing the plastic film cover with four or fewer seals in order to provide dimensionally stability to packing unit, the plastic film cover
35 being made of a web of plastic film material which is joined together along four or fewer elongate sealing portions for forming said plastic film cover.

The plastic film cover according to the method can be a film wrap that is wrapped around the packages.

5 The plastic film cover according to the method can be a shrink film that is shrunk onto the packages.

Where applicable, the above discussion relating to the packing unit is also relevant to the method and the shipping unit.

10 Brief Description of the Drawings

Figure 1 is a schematic perspective view of packages, the packages having an alternating orientation in a first direction and a second direction opposite to the first direction and the packages of an individual layer having a uniform
15 orientation in the first or the second direction, according to the invention.

Figure 2 is a schematic perspective view of a packing unit surrounded by a plastic film cover with longitudinal and transverse seals, which packing unit is illustrated as seen from two different directions (a) and (b), respectively.
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Figure 3 illustrates schematically different embodiments of the packing unit with longitudinal and transverse seals.

Figure 4 is a schematic perspective view of a packing unit according to the invention, which packing unit is partly surrounded by a plastic film cover.
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Figure 5 illustrates schematically a method for surrounding a group of packages with a plastic film cover.

30 Figure 6 represents schematic perspective views of (a) 24, (b) 3, (c) 2 and (d) 24 packing units according to the invention, which packing units are positioned on a load carrier.

Figure 7 illustrates schematically how a packing unit is wrapped in a plastic
35 film cover.

Figure 8 illustrates schematically a packing unit comprising six packages, which packing unit further comprises handles.

Description of Embodiments

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The invention will now be described in more detail and specific preferred embodiments, and variations of the same, will be shown. The discussions are intended to be clarifying and explanatory and are not to be regarded as limiting the scope of the invention. The figures referred to are schematic
10 illustrations and are not necessarily drawn to scale.

With reference to Figure 1, packages 1 will now be discussed, the packages having an alternating orientation in a first direction and a second direction opposite to the first direction and the packages of an individual layer having a
15 uniform orientation in the first or the second direction, according to the invention. In Figure 1 six packages 1 are illustrated. The packages 1 have in the upright position an upwardly tapering shape, with a narrower end 2 and a wider end 3. It will be appreciated that the packages are schematically illustrated. The packing unit 1 is so arranged that each package 1 has a side
20 wall facing a bottom of the packing unit 4. Figure 1 illustrates six packages 1 arranged one over another in two layers. However, according to the invention the packages 1 may be arranged in more than two layers. The number of packages can be a number other than six, for example four or higher. It is evident from Figure 1 that the even number of layers enables the group of
25 packages to assume essentially the shape of a right parallelepiped. It is understood that the shape does not exactly correspond to that of a right parallelepiped.

It may be preferable according to the invention for the packages to have two
30 opposite side walls and a bottom wall, which side walls and bottom wall are flexible, and the figures are intended, for example, to illustrate such packages.

With reference to Figure 2a and b, a specific embodiment of the invention will
35 now be described. Figures 2a and b illustrate a packing unit 4 seen from two different angles. The packing unit 4 comprises six packages 1 a-f, which packages are filled with a liquid product. The packages 1 are made of plastic

and are of the collapsible type and they have in the upright position an upwardly tapering shape. The packages 1 have an alternating orientation in a first direction and a second direction opposite to the first, the packages of an individual layer having a uniform orientation in the first or the second direction and being surrounded by a plastic film cover 5.

The number of packages of a packing unit according to the invention can be a number other than six. The number of packages can be four or higher. The number of packages can be two or higher. The number of packages of each layer can be two or higher.

The plastic film cover 5 provides dimensional stability to the packing unit 4 by fixing the positions of the separate packages.

The packing unit 4 has six faces, four of which are shown and referred to in the Figure as faces 6 a-d, the other two sides, which are not illustrated in the Figure, are diametrically opposed to side 6a and side 6c. In this example, the plastic film cover 5 surrounds all six sides 6 of the packing unit, and the plastic film cover 5 has three seals 13a-c, the seal 13a being a longitudinal seal and the seals 13b and c being transverse seals.

It will be appreciated that the plastic film cover 5 can have a number of seals 13 other than the number illustrated in Figures 2a and b. The number of seals 13 can be greater or smaller than the number illustrated in the Figures 2a and b. The plastic film cover 5 can for example have seals 13 at all six faces of the packing unit 4. The faces may be without seals 13, for example as illustrated in Figures 2a and b. According to the invention, the number of longitudinal seals is four or lower. There can be more than one seal 13 per face, but it might be preferable to have only one seal 13 per face.

The example further illustrates inventive packages having an alternating orientation in a first direction and a second direction opposite to the first, the packages of an individual layer having a uniform orientation in the first or the second direction. The packages comprise a first layer of packages (1 b, d, f) with a first direction R1 and a second layer of packages (1a, c, e) with a direction R2 opposite to the first direction R1. In this example the directions R1 and R2 are identical to the directions of tapering of the packages and the

directions are indicated by the arrows R1 and R1 in the Figure. It will be appreciated that directions R1 and R2 might as well be reversed.

With reference to Figures 3a-c, different embodiments of the packing unit with
5 longitudinal and transverse seals will be discussed. For the purpose of clarity the packages of the packing unit are not shown; only the plastic film cover 5, which in the present example is transparent, is reproduced in order to illustrate the packing unit.. In this way seals will be visible in the Figure no matter on which side of the packing unit 4 they are located. The plastic film
10 cover 5 is illustrated with a shape essentially corresponding to that of a parallelepiped. The web of plastic film according to the example has a longitudinal direction that substantially coincides with the direction of the seal 13a. Figure 3a and b illustrates a packing unit with two longitudinal seals 13 a and d and two transverse seals 13b and c. Figure 3c illustrates a packing unit
15 with one longitudinal seal 13a and two transverse seals 13 b and c.

The seals can be heat welded, for example, or joined together in another manner using heat and/or pressure. The seals can, for example, also be glued.

20 With reference to Figure 4, a specific embodiment of the invention will now be described. The Figure illustrates a packing unit 4 comprising six packages 1a-f, which packages are filled with a liquid product. The packages 1 are made of plastic and of the collapsible type and they have in the upright position an
25 upwardly tapering shape. The packages 1 have an alternating orientation in a first direction and a second direction opposite to the first, the packages of an individual layer having a uniform orientation in the first or the second direction and being partly surrounded by a plastic film cover 5, which has been wrapped around the packages 1. The packing unit 4 has six faces, four of
30 which are faces 6a-d surrounded by said plastic film cover 5. The plastic film cover 5 affords the packing unit 4 dimensional stability. Moreover, the example illustrates inventive packages having an alternating orientation in a first direction and a second direction opposite to the first direction, the packages of an individual layer having a uniform orientation in the first or the
35 second direction, comprising a first set of packages (1b, d, f) with a first direction R1 and a second set of packages (1a, c, e) with a direction R2 opposite to the first direction R1. In this example the directions R1 and R2 are

identical with the directions of tapering of the packages and the directions are indicated by the arrows R1 and R2 in the Figure. It will be appreciated that the directions R1 and R2 might as well be reversed.

5 With reference to Figure 5a-d, the method of manufacturing a packing unit according to the invention will be described below. The method comprises, inter alia, surrounding a group 14 of packages 1 with a plastic film cover 5, which completely surrounds the group 14 of packages, said surrounding operation affording the packages dimensional stability. It will be appreciated
10 that the orientation of the packages in the group 14 can differ, within the scope of the invention, from that which is illustrated in Figures 5a-d. In this example, the plastic film 9 is shown as being non-transparent. Figure 5a illustrates the group 14 of packages 1, which packages have been arranged so that they have an alternating orientation in a first direction and a second
15 direction opposite to the first, the packages of an individual layer having a uniform orientation in the first or the second direction, and a plastic film 9. In this example, the plastic film is arranged in the Figure in what might be considered a V-shape and the plastic can be considered to be folded in a
20 V-shape.

In Fig. 5b the plastic film has been arranged so that it substantially follows the contours of certain sides of the group 14 of packages 1.

In Fig. 5c a longitudinal seal 13a has been created. According to the
25 invention, as described by way of this and other embodiments or examples, a longitudinal seal 13a can thus be defined as a seal having a component in the longitudinal direction of the plastic film and a transverse seal as a seal having a component across the longitudinal direction of the plastic film. The longitudinal direction of the plastic film will be further discussed with reference
30 to Fig. 7. In this example the seals can be of the type mentioned above, or of any other available and suitable type. The parts of the plastic film that project from the seal can be removed in conjunction with the sealing operation, for example by cutting or any other optional method of removal. Moreover, the dimensions of the plastic film and the appearance of the seal can be such that
35 substantially none or only little of the plastic film project from the seal. The width of the plastic film can for example be selected to be only slightly wider than the distance along which it surrounds the group of packages.

Furthermore, according to the invention projecting parts of the plastic film can be folded tightly against the package. As is evident from the illustration, four sides of the group of packages are thus surrounded by a plastic film cover. If it is desirable and indeed convenient that only four sides should be

5 surrounded by a plastic film cover, parts of the plastic film 9 can conveniently be removed so that, for example, it does not project at all or only a little beyond the sides of the group 14 of packages 1 that are not surrounded. This means that the plastic film cover can be considered to only partly surround the group of packages. Fig. 5d illustrates the group of packages that are now

10 completely surrounded by a plastic film cover and where two transverse seals have been created, of which the transverse seal 13b is visible in the Figure and the transverse seal 13c and the longitudinal seal 13a are indicated by dashed lines. In this example, the transverse seals are oriented in the manner shown in the Figure, but they could have, still within the scope of the

15 invention, another orientation, for example they could have an extension from below upwards, which orientation differs substantially 90 degrees from the illustrated orientation. Those parts, if any, of the plastic film that project from the transverse seals can be removed or folded in the manner described above with reference to longitudinal seals.

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As a result, a packing unit has been created which comprises a group 14 of packages 1 and a plastic film cover 5, which completely surrounded the group of packages. The plastic film cover can be shrunk by heat treatment, which may provide dimensional stability, or increase the dimensional stability.

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The plastic film can have, within the scope of the invention, a folded shape other than the illustrated folded V-shape. The plastic film can for example have the shape of a tube or a pipe in which the packages are positioned. The plastic film cover thus produced can have, for instance, one longitudinal and

30 two transverse seals, by analogy with the discussions regarding the folded V-shape web of plastic film. The tube, or V-folded web of plastic film, can be made up of two webs of plastic film which are joined together along a longitudinal seal, the plastic film cover having two transverse and two longitudinal seals. Furthermore, according to the invention a group of

35 packages can be placed in a plastic bag or, alternatively, a tube which is sealed at one end, whereupon the plastic bag or the end-seal tube is sealed

in the transverse direction such that the packing unit comprises one or two, or more, transverse seals.

5 If the plastic film is tightened about the group 14 of packages 1, for example by shrinking, so that the circumference of the plastic film is slightly smaller than the circumference of the group of packages, this method enables the plastic film cover 5 to surround the group of packages with a tightening force. The tightening force can be varied depending on how tightly the film is shrunk about the group of packages. Shrinking can also be carried out in such a
10 manner that the cover surrounds the group without a tightening force. If the plastic film is applied substantially without a tightening force, this method enables the plastic film cover 5 according to the invention to surround the group of packages without a tightening force. Where a film wrap is used said tightening force can be achieved by wrapping, possibly in combination with
15 shrinking, of the plastic film cover. The tightening force can provide additional dimensional stability to the packing unit 4 by more tightly fixing the positions of the separate packages.

20 With reference to Figs 6a-d, shipping units 7a-d comprising a plurality of packing units 4a-d according to the invention will now be discussed. Each packing unit 4a-d comprises a plurality of packages which are not illustrated in the Figure. In the examples illustrated in the Figures the shipping units 7a-d are positioned or stacked on load carriers 8a-d.

25 In Fig. 6b the shipping unit 7b is surrounded by wrapping a plastic film 9 around it, which may, inter alia, provide protection during transport, increase the dimensional stability of the shipping unit 7b, the packing unit 4b and the inventive packages. In the example illustrated in the Figure, four sides of the shipping unit 7b will be surrounded by plastic film 9, but even five or six sides,
30 for example, could have been surrounded.

The shipping unit 7d in Fig. 6d comprises packing units 4 which are stacked in binding layers, which binding layers enable a more stable stacking.

35 With reference to Fig. 7, wrapping of a packing unit 4 comprising a group 14 of packages 1 for forming a plastic film cover 5 which at least partly surrounds the packages for providing dimensional stability to the packages will now be

discussed. The Figure is schematic and illustrates wrapping of a first turn around the packages. In this context, a system of coordinate's x-y-z is introduced, as illustrated in the Figure, and it is considered that the wrapping according to the Figure occurs in the x-z plane. When the wrapping occurs only in this plane, four out of a total of six sides of the group 14 of packages 1 will be surrounded by the plastic film cover 5. If wrapping occurs also in the x-y plane, five or six sides may be surrounded by the plastic film cover. It may be convenient to wrap the cover several turns, since the tightening force produced by the plastic film cover can be greater than it would with fewer turns, which may be desirable for example where there is a desire to create counter pressure beams in the liquid contained in the packages. Wrapping several turns may also afford a more substantial mechanical protection than wrapping only a single turn. It will be appreciated that wrapping may also occur only in the x-y plane. The wrapping planes can be selected depending on which orientation the package unit 4 will have during transport and, possibly stacking, of packing units. It will be appreciated that the part of the plastic film on the plastic film roll 10 that projects beyond the packing unit 4 might be folded back over the packing unit 4, for instance when the tightening force is increased. The longitudinal direction of a plastic film according to the invention can be considered to be the direction of the plastic film from the plastic film roll 10, which direction is indicated by the arrow 15, or the reversed direction, and this longitudinal direction is applicable to both plastic film used for wrapping and plastic film that is sealed. The longitudinal direction of a plastic film according to the invention can be defined as the direction of longitudinal extension of the plastic film. The plastic film may be a shrink film; it may for example be selected such that it shrinks when heating the packing unit 4 after wrapping, which shrinking may increase the tightening force.

A plastic film cover 5 that is obtained by means of wrapping according to the invention can be provided with both transverse and longitudinal seals according to the invention. As a result, it is possible, for example, to increase the dimensional stability and/or strength of the packing unit 4 or the packages 1.

With reference to Figs 8a-b, a packing unit 4 comprising handles 11a-c will now be discussed.

Fig. 8a illustrates the packing unit comprising a group of packages 1 which are surrounded by the plastic film cover 5. Part 12 c of the handle is glued to the plastic film cover, which allows the packing unit to be carried by means of the handle, without the handle coming loose from the packing unit. In the cases where, for example, the plastic film cover surrounds four sides of the group of packages, the handle can be attached to one or more of the packages or to the plastic film, whereupon plastic film is applied.

Fig. 8a illustrates the packing unit comprising a group of packages 1 which are wrapped in a plastic film cover 5. The plastic film cover 5 is wrapped around those parts 12a and b of the handles 11 that have been positioned such that after wrapping they are situated between the plastic film cover 5 and the packages, which wrapping can be sufficient to allow the packing unit to be carried by means of the handles, without the handles coming loose from the packing unit. The handles may also be attached, before wrapping, to one or more of the packages or to the plastic film, so as to ensure, for example, a better adhesion of the handles to the packing unit.

The packing units illustrated in Fig. 8 can suitably be carried by means of the handles and six packages is a convenient number when selling for example beverages. Each of the packages can hold, for example, one litre of beverage, but other volumes between for example 330 ml and 2 litres may also be convenient. The number of packages can be a number other than six.

Packages as discussed in the above examples and with reference to the Figures are packages according to the invention, which packages are of the collapsible type. By packages of the collapsible type is meant, for example, packages which have a chamber defined by flexible walls, which walls are joined together along a connecting portion. The walls normally comprise two opposite side walls and a bottom wall.

CLAIMS

1. A packing unit (4) comprising
a group of packages (1) filled with a liquid product which are of the
5 collapsible type and comprise a bottom wall and two opposite side walls,
which packages (1) in their upright position have an upwardly tapering shape,
characterised in that
the packages (1) are so arranged that each package (1) has a side
wall facing a bottom of the packing unit (4),
10 the packages (1) are arranged one over another in a plurality of layers
with a plurality of packages (1) in each layer,
said packages (1) having an alternating orientation in a first direction
and a second direction opposite to the first direction, and
the packages (1) of an individual layer having a uniform orientation in
15 the first or the second direction, and
a plastic film cover (5) which at least partly surrounds the group of packages
(1) for providing dimensional stability to the packing unit (4), the plastic film
cover (5) being made of a web of plastic film material which has been joined
together along four or fewer elongate sealing portions for forming said plastic
20 film cover.
2. A packing unit (4) as claimed in claim 1, wherein the packing unit
comprises a handle (11).
- 25 3. A packing unit (4) as claimed in claim 1 or 2, wherein the number of
packages (4) in each layer is identical.
4. A packing unit (4) as claimed in any one of the preceding claims,
wherein the group of packages (1) filled with a liquid product comprises four,
30 six, eight or ten packages (1).
5. A packing unit (4) as claimed in any one of the preceding claims,
wherein the plastic film cover (5) completely surrounds the group of packages
(1).
- 35 6. A packing unit (4) as claimed in claim 5, wherein the plastic film
cover (5) has one longitudinal and two transverse seals (13).

7. A packing unit (4) as claimed in any one of the preceding claims, wherein the plastic film cover (5) is a shrink film.

5 8. A packing unit (4) as claimed in any one of the preceding claims, wherein the plastic film cover (5) surrounds the group of packages (1) without a tightening force.

10 9. A packing unit (4) as claimed in any one of the preceding claims, wherein the plastic film cover (5) surrounds the group of packages (1) with a tightening force.

10. A shipping unit (7) comprising a plurality of packing units as claimed in claim 1.

15 11. A shipping unit (7) as claimed in claim 10, wherein the packing units (4) are stacked on a load carrier (8).

20 12. A shipping unit (7) as claimed in claim 10 or 11, wherein a stack formed of said packing units (4) is at least partly surrounded by a plastic film cover.

13. A method of manufacturing a packing unit (4), comprising the steps of

25 arranging a group of packages (1) filled with a liquid product which are of the collapsible type and comprise a bottom wall and two opposite side walls, which packages in their upright position have an upwardly tapering shape, stacked one over another in a plurality of layers with a plurality of packages (1) in each layer such that the packages (1) have an alternating orientation in a first direction and a second direction opposite to the first
30 direction, the packages (1) of an individual layer having a uniform orientation such that each package (1) has a side wall facing a bottom of the packing unit (4),

35 at least partly surrounding the packages (1) with plastic film cover (5) and providing the plastic film cover (5) with four or fewer seals (13) for providing dimensional stability to the packing unit (4), the plastic film cover (5) being made of a web of plastic film material which is joined together along four or fewer sealing portions for forming said plastic film cover.

14. A method as claimed in claim 13, wherein said plastic film cover (5) is a film wrap which is wrapped around the packages (1).

15. A method as claimed in claim 13 or 14, wherein said plastic film
5 cover (5) is a shrink film which is shrunk onto the packages (1).