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Double-walled cup

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(56) Related Art
US 5775577

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Abstract

A double-walled cup and a process for production of same are described. The cup comprises an inner cup and a tube-shaped outer sleeve, which is formed from a blank of paper material joined at its ends. The tube-shaped outer sleeve is slid axially onto a prefabricated inner sleeve and secured. The tube-shaped outer sleeve is formed from a flat blank by means of joining the ends of the blank before being slid on, whereby the ends of the blank are joined by means of an adhesive applied to a limited area of the outer sleeve. The ends of the blank are joined by means of a thermoplastic material in the form of an adhesive, which for example can be a hot-melt adhesive or a sealing varnish.

Fig. 1

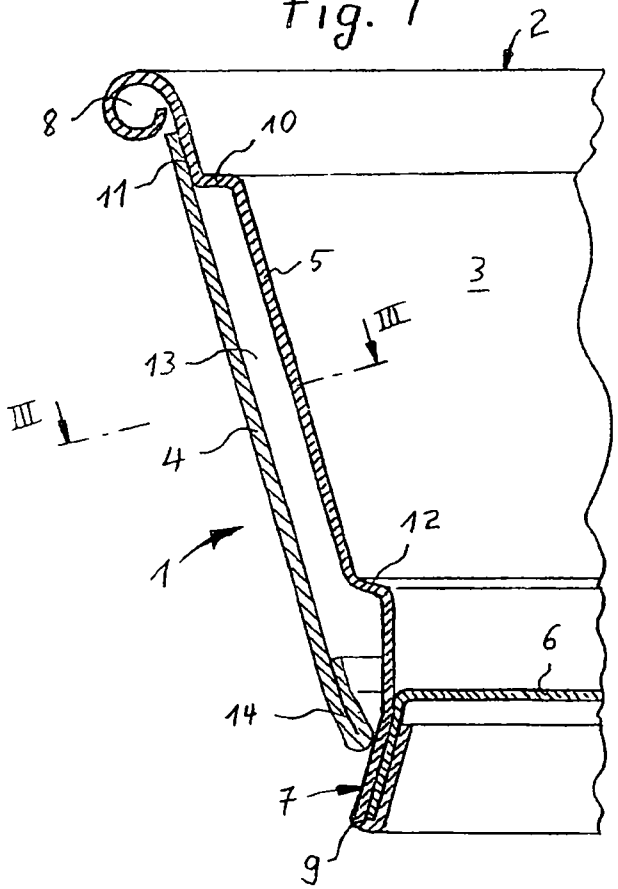

Fig. 2

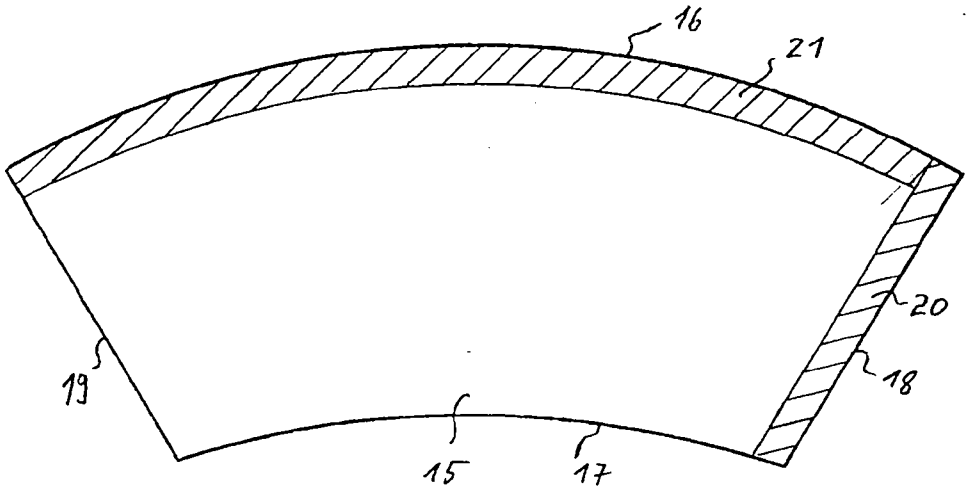

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Fig. 3A

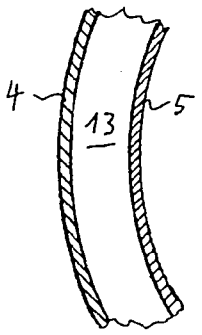


Fig. 3B

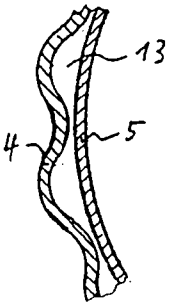


Fig. 4

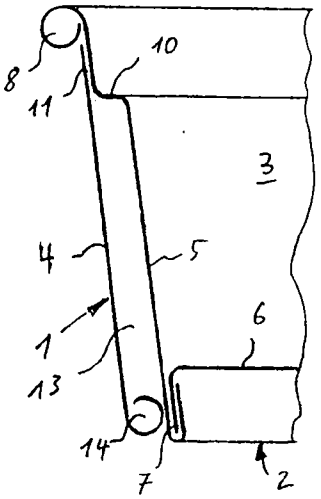


Fig. 6

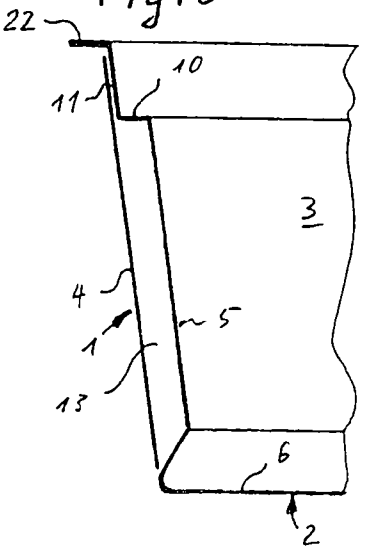


Fig. 5

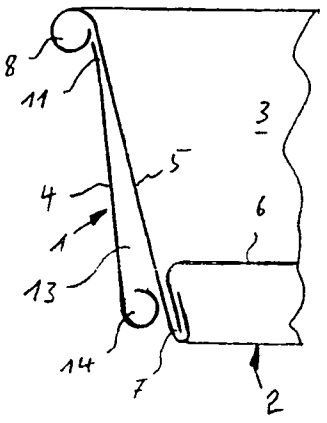
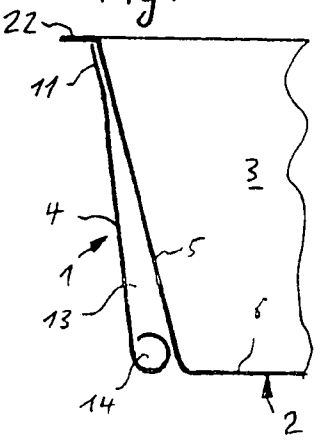


Fig. 7



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AUSTRALIA

Patents Act 1990

COMPLETE SPECIFICATION

Standard Patent

Applicant(s):

PTM Packaging Tools Machinery PTE. Ltd.

Invention Title:

Double-walled cup

The following statement is a full description of this invention, including the best method for performing it known to me/us:

BACKGROUND AND SUMMARY OF THE INVENTION

Double-walled cup

The present invention relates to a process for the manufacture of a double-walled cup in which a tube-shaped outer sleeve made of paper material is axially slid onto a pre-fabricated inner cup and attached thereto, whereby, before being slid onto the inner cup, the tube-shaped outer sleeve is formed from a flat blank by means of joining the ends of the blank, and whereby the ends of the blank are joined together by means of applying an adhesive to a limited area of the outer sleeve. The present invention further relates to a cup manufactured according to this process.

A process of this type is prior art in German published patent application DE 198 40 841 A1. A cold glue is applied as an adhesive to a limited area on the flat blank. The ends of the blank are glued together so that a tube is formed. This tube is slid in the form of an outer sleeve onto a pre-fabricated inner cup. Due to the stability of the tube-shaped prefabricated outer sleeve, an essentially ring-shaped air space can be formed between the outer sleeve and the inner sleeve of the cup, whereby outer sleeve and inner sleeve do not come into contact along the air space. The thickness of the essentially ring-shaped air space can be increased due to a discontinuous widening in the upper area of the inner sleeve, so that the insulation effect of the cup is improved.

By using cold glue as an adhesive for joining the ends of the blank of the outer sleeve, the outer sleeve can be made from a very cost-effective paper material. The blanks for the outer sleeve can consist of a single-layered paper material without additional plastic coating. In contrast to the inner cup, whose paper material comprises a plastic coating on the side forming the inner space, the outer sleeve does not come into contact with the liquid poured into the cup. A non-coated paper material is therefore sufficient for achieving the isolation effect of the double-walled cup.

The gluing of the ends of the blanks with cold glue limits the working speed of the manufacturing apparatus, as cold glue requires a relatively long time before it sets. As a result, the ends of the blank must remain pressed together for a relatively long time, in order to prevent the adhesive attachment dissolving. In addition, the processing of cold glue is complex, as cold glue often exhibits fluctuations in

viscosity, which prevent an exact dosage of the amount of glue applied. Excessive glue application results in contamination of the production machine, so that the machine often has to be stopped for cleaning.

It is therefore desirable to create an improved process for the production of double-walled cups.

This may be achieved in accordance with the present invention in that a thermoplastic material is used as an adhesive for joining the ends of the blank to form a tube-shaped outer sleeve.

The invention provides a process for the manufacture of a double-walled cup in which a tube-shaped outer sleeve made of paper material is axially slid onto a pre-fabricated inner cup and attached thereto, whereby, before being slid onto the inner cup, the tube-shaped outer sleeve is formed from a flat blank by means of joining the ends of the blank, and whereby the ends of the blank are joined together by means of applying an adhesive to a limited area of the outer sleeve, wherein for joining the ends of the blank to a tube-shaped outer sleeve, a thermoplastic material is used as an adhesive.

The invention also provides a double-walled cup comprising an inner cup and a tube-shaped outer sleeve made of a paper material, said outer sleeve being formed from a blank joined at its ends which ends of the blank are joined by means of an adhesive applied to a limited area of the outer sleeve, wherein the ends of the blank of the tube-shaped outer sleeve are joined by means of an adhesive in the form of a thermoplastic material, the outer sleeve is fixed to the inner cup in an area located above a maximum liquid level of the inner cup, and a lower end of the outer sleeve is arranged below the bottom of the inner cup.

A thermoplastic material, for example a hot-melt adhesive, can be applied to limited areas of the outer sleeve with a defined viscosity and joins the ends very quickly when pressed together. The speed of the production of the double-walled cup is greatly increased as a result. In addition, the machine is not contaminated by inexact dosages of adhesive, so that frequent cleaning procedures are omitted. The hot-melt adhesive is applied in liquid form to defined areas of the blank before the ends of the blank are joined to form a tube-shaped outer sleeve. The ends of the blank need only be pressed together for a short time in order to form a secure and stable bond.

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In an embodiment, a thermoplastic material in the form of sealing varnish can also be used. The sealing varnish can be applied to the flat blank in a procedural step prior to the actual production process of the double-walled cup or at least prior to the forming of the outer sleeve. The sealing varnish can for example be applied in the form of a stripe on one end of the blank, before the blank is fed to the production machine for the double-walled cup. The application of the sealing varnish can take place for example in a printing machine. The sealing varnish is thus already solidified on the flat blank and does not disturb the feeding of the blank to the cup production machine. When the ends of the blank are joined together to form the outer sleeve, the sealing varnish is re-heated, so that the ends are glued together after being briefly pressed together. The application of sealing varnish before the blank for the outer sleeve is fed to the cup production machine has the advantage that no application or dosing devices for adhesives need be present in the cup production machine. Any contamination by adhesives can be effectively prevented. The sealing varnish can be applied very sparingly in defined areas of the outer sleeve where it is required for bonding. In addition to the ends of the blank, the joining of the tube-shaped outer sleeve to the inner sleeve can also be effected by a thermoplastic

material in the form of an adhesive. For this purpose, a stripe of sealing varnish can be applied along a curved edge of the blank.

A further advantage of the use of sealing varnish as a thermoplastic material for joining the outer sleeve is that in the cup-producing machine, devices for joining the ends of the blank can be used similarly to the way they are applied for joining the inner sleeve in the production of the inner cup. The blanks for the outer sleeve with the sealing varnish printed onto defined areas can be processed in principle identically to the blanks for the inner cup coated with polyethylene foil. Sealing devices of this type are known so that a detailed description can be omitted at this point.

The design of the inner cup is optional. It can for example consist of a paper material. The inner cup can also be a plastic cup. The design of the outer sleeve can also take many forms. The outer sleeve can for example be made from a smooth paper material or from a fluted paper material.

The use of a thermoplastic material as an adhesive for the tube-shaped outer sleeve is particularly advantageous when the inner cup displays a discontinuous widening in diameter in the form of a shoulder in the upper area of the inner sleeve. The jump in diameter is located close below a lip of the inner cup so that a narrow area for attaching the outer sleeve remains between the widening and the lip. This area for attaching the outer sleeve normally lies above the level of hot liquid with which the cup is filled. Below the discontinuous widening in diameter, an essentially ring-shaped air space is located between the outer sleeve and the inner sleeve, along which air space the outer sleeve and the inner sleeve do not come into contact. The joining point of the ends of the blank of the tube-shaped outer sleeve extending along the longitudinal axis of the cup is also separated by means of this air space from the inner sleeve in contact with the hot liquid. There is therefore no risk that the joining points on the outer sleeve adhered by means of the thermoplastic material will solubilize when hot liquid is poured into the double-walled cup. In the non-generic European published patent application EP 1 785 370 A1, the application of a hot-melt adhesive for temporarily joining an outer sleeve to an inner sleeve is described. The outer sleeve is not adhered in the form of a tube, but rather wound directly around the sleeve of the inner cup and adhered there. A cold glue is applied in addition to the hot-melt adhesive for permanent adherence. The disadvantages of the application of cold glue have been described above. The cold glue is necessary in

the embodiment of the European published patent application EP 1 785 370 A1, as the joining between the inner sleeve and the outer sleeve, created by the hot-melt adhesive, may solubilize again when hot liquid is poured into the cup, and there is a risk that the outer sleeve may tear open, as a result of the internal stress of the paper material, and fall from the inner cup.

BRIEF DESCRIPTION OF THE DRAWINGS

These and further features and advantages of the present invention will become more readily apparent from the following detailed description thereof when taken in conjunction with the accompanying drawings wherein:

Figure 1 is a partly shown double-walled cup in longitudinal section,

Figure 2 shows a scaled down flat-lying blank for a tube-shaped outer sleeve of the double-walled cup of Figure 1,

Figures 3A and 3B each show an intersectional view along the cutting surface III-III of Figure 1,

Figures 4 to 7 each show views similar to Figure 1 of various forms of the double- walled cup.

DETAILED DESCRIPTION OF THE DRAWINGS

The double-walled cup 1 shown in Figure 1 comprises essentially an inner cup 2 having an interior space 3 which can be filled and also an outer sleeve 4. The fillable interior space 3 of the inner cup 2 is formed by a conical inner sleeve 5 and a pot-shaped bottom 6. The open side of the pot-shaped bottom 6 is arranged in such a way that it is facing away from the filling opening of the cup 1. The bottom 6 with its wall is joined liquid-tight to the sleeve 2 in the area of its smallest diameter by means of the formation of a bottom skirt 7. In the area of the bottom skirt 7, the material of the inner sleeve 5 is placed around the wall 31 of the bottom 6 and folded inwards. The inner sleeve 5 comprises at its top rim, that is, in the area of its largest circumference, an outwardly rolled lip 8, which surrounds the filling opening.

The conical feature of the inner sleeve 5 is hereby understood in that the inner sleeve 5 tapers in longitudinal section as shown in Figure 1 from the lip 8 to the bottom 6 at least in certain areas. The form of the inner sleeve 5 in cross section is hereby

irrelevant. The inner sleeve 5 is advantageously circular in cross section, but can alternatively be oval for example, or rectangular with rounded corners. The inner cup has a truncated cone shape in the case of a round cross section of the conical inner sleeve 5, while in the case of a rectangular cross section of the cup, it is more likely to be a truncated pyramid shape.

The bottom skirt 7 comprises at least in one area along its periphery an outwardly projecting widening 9. The widening 9 can alternatively extend only over a lower portion of the bottom skirt 7. A lower edge 14 of the widening 9 on the bottom skirt 7 forms the standing surface for the cup 1. The cup 1 stands, when in use, on its standing surface, which is enlarged by the widening 9. This makes it difficult for the cup 1 to tip over. The widening 9 is advantageously designed continuously around the circumference of the bottom skirt 7.

In the case of cups 1 made of paper material, the bottom skirt 7 is a very important element of the cup 1. The bottom skirt 7 is vital for the joining between the inner sleeve 5 and the bottom 6. The material of the bottom 6 is adhered or sealed to the material of the inner sleeve 5 in the area of the bottom skirt 7 in order to be liquid-tight for at least a certain amount of time. The term "paper material" can involve various materials having at least one layer of paper, paperboard or cardboard, out of which the bottom and the inner sleeve 5 are made. In addition, the material can comprise one or several layers of plastic and/or aluminium. Advantageously the paper material is coated on the side bordering the inner space 3 with a thin plastic layer, advantageously of polyethylene. In contrast to pure plastic material, the shaping and in particular the stretching properties of such paper materials are limited. In the case of too much shaping, the paper material itself or also the provided coating can tear, so that the liquid tightness is impaired. In the case of cups 1 from paper material, the bottom skirt is therefore 7 a significant design feature which cannot be omitted.

In the area below the lip 8, the inner sleeve 5 can advantageously comprise a discontinuous widening in diameter in the form of a shoulder 10, which can be seen as a jump in cross section from the bottom 6 to the lip 8. Between the lip 8 and the shoulder 10, a supporting surface 11 for the outer sleeve 4 is located on the outer surface of the inner sleeve 5.

In order that a number of double-walled cups 1 can be well stacked and easily de-stacked again, a bead 12 can be formed into the inner sleeve 5 as a means for stacking, on which bead 12 the widening 9 of the bottom skirt 7 of a similar cup to be inserted into the inner space is stacked. The stacked cups 1 are thus prevented from being wedged together.

The outer sleeve 4 can be designed in a variety of ways. Two possible designs of the outer sleeve 4 are shown in Figures 3A and 3B. A smooth outer sleeve 4 can be seen in Figure 3A, which outer sleeve 4 surrounds the inner sleeve 5 at a constant distance. A fluted outer sleeve 4 is shown in Figure 3B. The essentially ring-shaped air space 13 has as a result a varying width. Depending on what is required, it can be provided that the areas of the outer sleeve 4 located nearest to the inner sleeve 5 have an even shorter distance to the inner sleeve 5 or alternatively touch the inner sleeve 5, so that the outer sleeve is supported on the inner sleeve 2, resulting in an improved stability of the double-walled cup 1.

For the manufacture of a double-walled cup 1 a prefabricated inner cup 2 is used in the known way. This prefabricated inner cup 2 is joined to a tube-shaped outer sleeve 4, so that between the outer sleeve 4 and the inner sleeve 5 of the cup 1, an essentially ring-shaped air space 13 is formed, along which the outer sleeve 4 and the inner sleeve 5 do not come into contact. The widening 9 can hereby be formed before or after the outer sleeve 4 has been slid into place. The air space 13 has good insulation properties, so that the double-walled cup 1 can be easily held in the hand when the inner space 3 is filled with very hot liquid. An inwardly curled-in part 14 is provide at the bottom end of the outer sleeve 4, with which the outer sleeve 4 is supported on the inner sleeve 2.

A flat blank 15 shown in Figure 2 is used for making the outer sleeve 4. The flat blank 15 has approximately the shape of a segment out of a circular ring having two curved edges 16 and 17 and two straight ends 17 and 18. In contrast to the bottom 6 and the inner sleeve 5, the blank 15 for the outer sleeve 4 consists of a non-coated paper material, as the outer sleeve 4 does not come into contact with the poured-in liquid when the cup 1 is in use. For environmental reasons it is advantageous to minimize the amount of plastic-coated paper material in the double-walled cup 1. The double-walled cup 1 is usually used as a non-reusable cup for hot beverages and subsequently disposed of after one use. The less plastic the cup 1 contains, the more paper material can be recycled.

The blank 15 is wound around a conical mandrel and the end 18 is joined to the end 19 in an overlapping way. For the purposes of joining the two ends 18 and 19, an adhesive in the form of a thermoplastic material is applied to a limited area on the end 18. The defined area on the end 18 of the blank 15, to which the thermoplastic material is applied, is denoted in Figure 2 by hatching having the reference number 20.

Adhesives in the form of two different thermoplastic materials are particularly well suited for joining the ends 18 and 19 of the blank 15 to the tube-shaped outer sleeve 4. A hot-melt adhesive can be used as a thermoplastic material. The hot-melt adhesive is applied in liquid form to the defined area 20 of the blank 15 before the ends 18 and 19 are joined. A dosing device can be provided for this purpose, which applies the hot-melt adhesive at a defined temperature through a nozzle onto the blank 15. Subsequently, the end 19 is laid over the area 20 on the end 18 and pressed together. The hot-melt adhesive then cools down and the ends 18 and 19 are joined together within a very short time.

A particularly advantageous alternative thermoplastic material can be a sealing varnish. The sealing varnish is printed onto the flat blank 15 in the area 20 by means of a printing machine and becomes hard. Prefabricated blanks 15 comprising the applied sealing varnish in the area 20 can be processed in the cup-producing machine in the manufacture of the double-walled cup 1, without the necessity for a further application of adhesive in the cup-producing machine. The blank 15 with the previously applied sealing varnish in the area 20 is wound around a mandrel, whereby the end 19 is laid over an area 20 on the end 18. By means of a short heating effect, the ends 18 and 19 are pressed together so that the sealing varnish is re-heated, thus adhering the ends 18 and 19 to each other.

Subsequent to the joining of the ends 18 and 19 of the blank 15 to a tube-shaped outer sleeve 4 with the thermoplastic material acting as an adhesive, the inwardly curled-in part 14 is formed at the curve-shaped edge 17, and the tube-shaped outer sleeve 4 is removed from the mandrel. The tube-shaped outer sleeve 4 is then slid in axial direction onto the prefabricated inner cup 2 from below and attached to the inner cup 2. Attaching the outer sleeve 4 to the inner cup 2 takes place in that an area on the upper edge 16 of the outer sleeve 4 is placed on the supporting surface 11 of the inner sleeve 5. Depending on the type of thermoplastic material applied as

an adhesive, the attachment of the tube-shaped outer sleeve 4 to the inner cup 2 can also be carried out in different ways. In the case of an application of hot-melt adhesive, the hot-melt adhesive is applied in liquid form either on the outer sleeve 4 in the area of the upper edge 16 or onto the supporting surface 11 of the inner cup, before the outer sleeve 4 is slid onto the inner cup 2 from below. After sliding the outer sleeve 4 onto the inner sleeve 2, the outer sleeve 4 can be pressed with the inner sleeve 5 in the area between the shoulder 10 and the lip 8.

In the case of an application of sealing varnish as a thermoplastic material, a defined area 21 is provided on the blank 15 along the curve-shaped edge 16 analogue to the area 20 on the end 18, to which defined area 21 sealing varnish is applied. The area 21, is located after the joining of the ends 18 and 19 of the blank, on the inner side of the tube-shaped outer sleeve 4 and comes into contact with the contact surface 11 of the inner cup 2 after the outer sleeve 4 is slid on. To join the outer sleeve 4 with the inner cup 2, the outer sleeve 4 and the inner sleeve 5 are pressed in the area 11 and sealed by heating the sealing varnish which is applied between the inner sleeve 5 and outer sleeve 4.

Pressing the outer sleeve 4 and the inner sleeve 5 in the area 11 with the adhesive in the form of an intermediary thermoplastic material can take place in various ways depending on requirements. A continuous pressing over the entire circumference of the cup 1 can be advantageous, so that a stable attachment between the outer sleeve 4 and the inner cup 2 is formed. It can also be sufficient, however, to press the outer sleeve 4 and the inner sleeve 5 together only at locally defined areas within the area 11, so that the outer sleeve 4 is not attached along the entire circumference of the cup 1with the inner sleeve 2. For a variation of this type it can be advantageous to apply the thermoplastic material only in those areas which are then subsequently pressed. In the case of a hot-melt adhesive it can for example be sufficient to apply said hot-melt adhesive only in a series of defined points, before the outer sleeve 4 is slid from below onto the inner sleeve 2. In the case of an application of sealing varnish, it can be provided that sealing varnish is applied only in parts of the area 21 along the curve-shaped edge 16 of the blank 15. The amount of thermoplastic material required for the manufacture of the double-walled cup 1 can be hereby minimized.

To illustrate the present invention, various embodiments of double-walled cups 1 are shown in Figures 4 to 7. Identical references denote identical parts as in Figures 1

and 2. The explanations in reference to the Figures 1 and 2 are also identical so that a repeat description is not necessary. In particular, the outer sleeve 4 can take either a smooth or a fluted form in the shown variations in Figures 3A and 3B.

In Figure 4 a double-walled cup 1 is shown, which differs from the cup in Figure 1 in that the skirt 7 continues the conical inner sleeve 5 without a widening. The curled-in part 14 of the outer sleeve 4 is not pressed flat and is also supported on the outer circumference of the inner sleeve 5.

In the case of the double-walled cup 1 of Figure 5 and in contrast to the cup 1 in Figure 4, the shoulder 10 below the lip 8 is omitted. The inner sleeve 5 of the inner cup 2 extends at a continuous and constant angle of inclination from the bottom 6 to the lip 8. As the contact surface 11 of the tube-shaped outer sleeve 4 is located in the case of the cup in Figure 5 above the liquid level in the inner space 3 of the hot liquid to be filled in, there is no risk that the thermoplastic adhesive on the outer sleeve 4 becomes soft again due to the heat of the liquid.

Figures 6 shows a double-walled cup 1 which comprises an inner cup 2 made of a synthetic material. In the case of the synthetic inner cup 2, the inner sleeve 5 and the bottom 6 are one-piece parts. A bottom skirt 7, as in the case of the paper material inner cups 2, is not necessary. Instead of a lip 8, the inner cup 2 in Figure 6 comprises a flange 22, which is formed on the inner sleeve 5 on the upper rim. A shoulder is arranged below the flange 22. The contact surface 11 for the outer sleeve 4 is located between the flange 22 and the shoulder 10.

A variation of a double-walled cup 1 is shown in Figure 7, in which the inner cup 2 is made of a synthetic material as the inner cup 2 of Figure 6. The inner sleeve 5 according to Figure 7 displays between the bottom 6 and flange 22 a constant angle of inclination, which is not interrupted by shoulders or beads. The outer sleeve 4 lies below the flange 22 in the area of a contact surface 11 and has a curled-in part 14 at the lower end of the outer sleeve 4 on the inner sleeve 5 of the inner cup 2.

In the claims which follow and in the preceding description of the invention, except where the context requires otherwise due to express language or necessary implication, the word "comprise" or variations such as "comprises" or "comprising" is used in an inclusive sense, i.e. to specify the presence of the stated features but not to preclude the presence or addition of further features in various embodiments of the invention.

It is to be understood that, if any prior art publication is referred to herein, such reference does not constitute an admission that the publication forms a part of the common general knowledge in the art, in Australia or any other country.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A process for the manufacture of a double-walled cup in which a tube-shaped outer sleeve made of paper material is axially slid onto a pre-fabricated inner cup and attached thereto, whereby, before being slid onto the inner cup, the tube-shaped outer sleeve is formed from a flat blank by means of joining the ends of the blank, and whereby the ends of the blank are joined together by means of applying an adhesive to a limited area of the outer sleeve, wherein for joining the ends of the blank to a tube-shaped outer sleeve, a thermoplastic material is used as an adhesive.

2. A process according to claim 1, wherein a hot-melt adhesive is used as a thermoplastic material, which hot-melt adhesive is applied to a defined area of the blank before the joining of the ends of the blank to the tube- shaped outer sleeve.

3. A process according to claim 1, wherein a sealing varnish is used as a thermoplastic material, which sealing varnish is applied to the flat blank in a procedural step preceding the forming of the outer sleeve, which sealing varnish hardens on the flat blank, and which sealing varnish is re-heated during the joining of the ends of the blank to a tube-shaped outer sleeve, thus adhering the ends together.

4. A process according to any one of the claims 1 to 3, wherein in the joining process of the tube-shaped outer sleeve to the inner sleeve, a thermoplastic material is also used as an adhesive, which thermoplastic material is applied in a defined area of the outer sleeve.

5. A double-walled cup comprising an inner cup and a tube-shaped outer sleeve made of a paper material, said outer sleeve being formed from a blank joined at its ends which ends of the blank are joined by means of an adhesive applied to a limited area of the outer sleeve, wherein the ends of the blank of the tube-shaped outer sleeve are joined by means of an adhesive in the form of a thermoplastic material, the outer sleeve is fixed to the inner cup in an area located above a maximum liquid level of the inner cup, and a lower end of the outer sleeve is arranged below the bottom of the inner cup.

6. A cup according to claim 5, wherein the ends of the blank of the tube-shaped outer sleeve are joined by means of a hot-melt adhesive.

7. A cup according to claim 5, wherein the ends the blank of the tube-shaped outer sleeve are joined by means of a sealing varnish.

8. A cup according to any one of the claims 5 to 7, wherein the tube-shaped outer sleeve is joined to the inner cup also by means of an adhesive in the form of a thermoplastic material which is applied to a defined area of the outer sleeve.

9. A process substantially as herein described with reference to the accompanying drawings.

10. A cup substantially as herein described with reference to the accompanying drawings.

Fig. 1

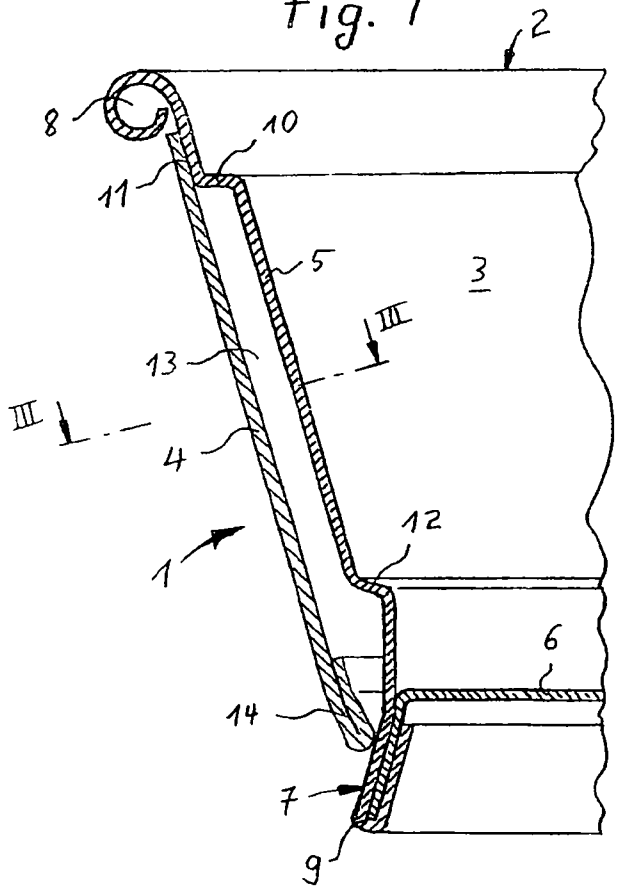

Fig. 2

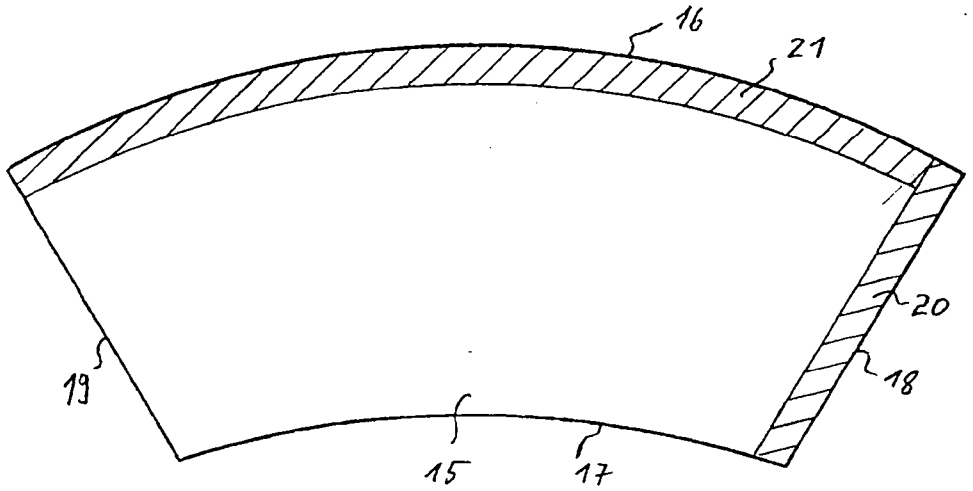

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Fig. 3A

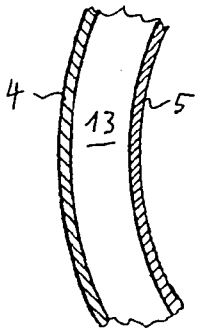

Fig. 3B

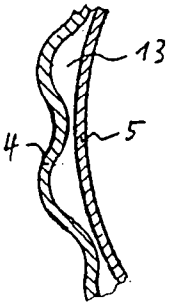

Fig. 4

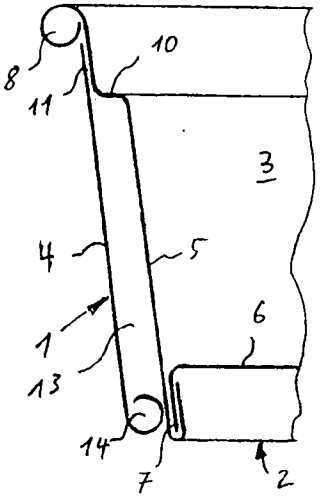

Fig. 6

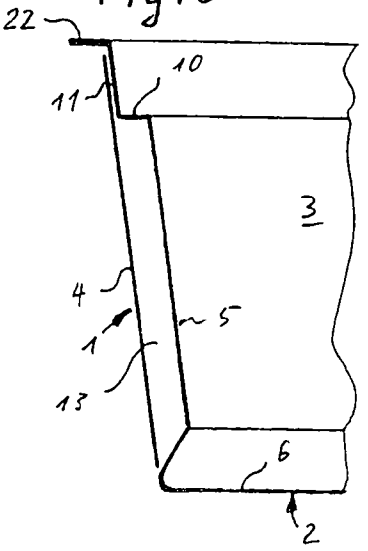

Fig. 5

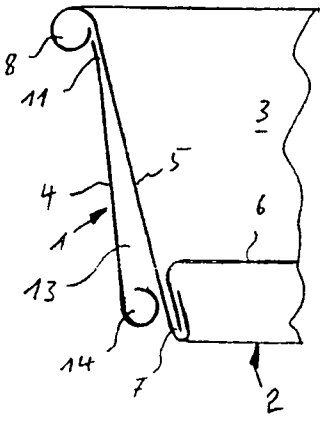

Fig. 7