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(54) Benævnelse: **Svejsbare folielåg til PP.**

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DESCRIPTION

The prior art

[0001] The invention relates to a method of making a punched sheet lid according to the introductory portion of claim 1 as well as a punched sheet lid made according to the method and use of such a punched sheet lid as a lid of a polypropylene container.
WO 98/25760 A1 discloses a sheet laminate, where the sheet is made by laminating two sheets containing several separate layers together. The sheet laminate may be used as a lid on containers, said sheet being welded to the edge of the container. EP2108507 discloses a method of making a laminate used as reclosable lid on plastics tray, that involves laminating a pressure sensitive adhesive layer and a protective layer on a base sheet to form a material followed by applying an optional primer and an optional welding layer thereon. Owing to the selection of material and the laminated structure with many layers in the two sheets in the laminate, the known type of sheet will not possess a sufficient rigidity to be suitable for the punching for lids before they are applied to the container, as a lid of this type will typically curl after the punching.
Sheets are also known in various materials and are used as a lid on packages, e.g. cups and bottles, for the packaging of especially milk products, salads, pâtés, etc. The lid may be made of Al sheet, to which a layer of welding lacquer has been applied in order for it to be able to adhere to the package.
This type of lid, however, is not transparent, which is a widespread wish among consumers.
When using a PET sheet which is transparent, a layer of welding lacquer has to be applied, which, since it is milky, is applied only to the rim where the welding to the lid is to take place in order not to destroy the transparency.

[0002] The drawback of this application of welding lacquer is that it has to be applied precisely, either to the punched sheet lids or in an assembled form to a web of sheet in connection with the actual closure of the package.

[0003] This adds to the costs, and, in any event, the welding lacquer leaves a visible rim along the lid edge, which is an aesthetic drawback.

[0004] GB 2370808 A and EP 2108507 A1 disclose sheet lids comprising a PP layer and a pressure sensitive adhesive (PSA) for manufacture of resealable packages.

The object of the invention

[0005] It is the object of the invention to remedy these drawbacks and deficiencies of the use of a PET sheet in connection with PP packages, and this is achieved according to the invention by a method according to claim 1.

[0006] The sheet lid made by the method comprises a transparent polyester sheet (PET), where an additional layer is applied onto the transparent polyester sheet (PET) in the form of a coextruded layer of a polyolefin layer and a PP polymer layer to form the sheet, said polyolefin layer being disposed between the transparent polyester sheet (PET) and the PP polymer layer.

[0007] First and foremost, this ensures that complete transparency is provided, even over the weld. Further, a frequently considerable waste of material is avoided, since there are no special requirements with respect to the position of the weldable coating, as this is present everywhere on the sheet. Finally, the coating of the transparent PET sheet ensures that the punched lid possesses a suitable rigidity, which prevents the lid from curling, thereby making it possible to punch lids.
Further, it is very advantageously ensured that the expensive printing processes, where a layer of welding lacquer has to be applied, are avoided.

[0008] All these factors contribute to simplifying and thereby reducing the costs of the sheet, which, as mentioned, has been given complete transparency.
Finally, the extrusion of the welding layer means that this lid sheet is stronger than a corresponding one provided with welding lacquer, thereby allowing the thickness of the PET sheet to be reduced correspondingly, thus achieving a saving of weight and material of about 15%.
The polyolefin layer is a polyethylene (PE) layer, preferably in the form of a homopolymer or a copolymer of ethylene, which contains propylene units in one embodiment, and that the coextrusion of the polyolefin layer/PE layer and the PP polymer layer onto the transparent polyester sheet (PET) takes place such that the polyolefin layer, such as the PE layer, is disposed between the transparent polyester sheet (PET) and the PP polymer layer.

[0009] When a primer is applied to the transparent polyester sheet (PET) prior to the application of the coextruded polyolefin layers, including PE layers, and PP layers, an enhanced adhesion is achieved between the PET layer and the PE layer. The enhanced adhesion between the PET layer and the PE layer allows the delamination to be controlled, said delamination taking place between the polyolefin layer or the PE layer and the PP layer.
When the PP layer is disposed against the PP package, safe fusion and thereby tightly fitting assembly of lid and container are achieved.

[0010] When using a PET sheet with a thickness of min. 23 µm and the applied coextruded layer with an overall weight of min. 8 g/m^2, corresponding to a thickness of min. 9 µm, a relatively inexpensive and material-saving lid sheet is achieved.

[0011] The sheet is punched for lids, and finally it is expedient to use the sheet lid for welding to containers and the like, in that the sheet is punched to the final shape of the sheet lid prior to the welding to the container, said sheet lid being welded to the container with the PP layer, which constitutes a welding layer facing toward the container, and that the lid, by a subsequent separation from the container by a pull in the sheet lid, causes the PE layer to remain on the

PET sheet and the PP layer to remain on the PP cup, as the PE and PP layers delaminate. This ensures that when the sheet is pulled off the container, a totally precise delamination of the PE layer and the PP layer will take place, thereby ensuring that the sheet is pulled off without the lid being torn to pieces.

The drawing

[0012] An example of a method of making a sheet lid according to the invention and its use will be described more fully below with reference to the drawing, in which

fig. 1
shows a cup with a lid sheet prior to the welding-together, and

fig. 2
shows a sectional view of the cup and the lid sheet after pulling-off, opening, seen in the direction II - II in fig. 1.

Description of an exemplary embodiment

[0013] The example shown in fig. 1 consists of a cup 1 which is made of PP.

[0014] The cup may be of the type which is known as a package for yoghurt and similar milk products. But it may also be a cup for salad foods or a bottle for milk or soft drinks.
In the example shown, the package 1 is provided with an upper rim 3, which is e.g. plane on the upper side.
When this cup 1 has been filled with its contents, it has to be closed with a lid 2. This lid 2 has preferably been punched in advance and is thus adapted to the opening of the cup 1.

[0015] This lid 2, which consists of a sheet laminate, is shown in a sectional view in fig. 2. It comprises a base sheet 4 of PET, which is transparent, and may have a thickness of between 23 and 50 µm. The thickness is adapted to the need for strength, barrier properties, size, etc.

[0016] On this base sheet 4, a layer PE, which is designated 5a, and a layer of PP, which is designated 5b, are provided by coextrusion. The latter constitutes a welding layer which is intended to be welded together with the rim portion 3 of the PP cup. The PE layer 5a may be a homopolymer or a copolymer of ethylene - a suitable ethylene copolymer contains propylene units - and will just be called the PE layer. The PP layer 5b may likewise be a homopolymer or a copolymer of propylene ethylene units - a suitable copolymer may contain ethylene units - and will be called the PP layer.
These two layers 5a and 5b preferably have an overall amount of between 8 and 20 g/m^2, or corresponding to about 9 - 22 µm. The PE layer preferably has a thickness of 5 - 15 g/m^2,

corresponding to about 5.5 - 17 µm, and the PP layer preferably has a thickness of 4 - 6 g/m^2, or corresponding to about 4.3 - 6.5 µm.

[0017] In a preferred embodiment, the base sheet 4 of polyester PET has applied thereto a primer 6, which ensures enhanced adhesion between the polyester (PET) in the base sheet 4 and the PE layer 5a in the coextruded layer 5, which is applied onto the base sheet 4. The preferred primer is acrylic-based and contains polyethyleneimine (PEI), where especially PEI is responsible for the enhanced adhesion between the layers of PET and PE. The limit value of the adhesion is not quite clear as yet, but it is expected to be within 2 - 5 N for a 15 mm wide test strip.

[0018] An alternative embodiment of making this sheet 2 comprises extrusion of a base sheet 4 and, by coextrusion, the creation of a first layer 5a and an additional layer 5b, said layers being put together to form the lid sheet 2.

[0019] It is preferred that the lid sheet is calendered immediately after the application of the coating to the transparent PET sheet.

[0020] These methods provide the advantage that the sheet laminate 2 will be transparent and will be weldable in its full extent. Thereby, any lid shape and dimension may be punched from a roll of sheet, as the lid may be adapted to the size and shape of the package.

[0021] In connection with the filling of packages, e.g. cups, in a filling machine, the lid is applied subsequently by application and welding to the rim portion 3.

[0022] When the package has thus been filled and closed with a lid 2, the user will be able to pull off the lid by pulling the lid flap, as indicated in fig. 2.

[0023] Hereby, the two layers 5a and 5b, PE and PP, respectively, will be separated, delaminated, in such a manner that the pullin-off, the opening, is controlled and totally precise.

[0024] Since the two layers 5a and 5b are relatively stiff, the dimensions of the base sheet 4 may be reduced, thus saving weight as well as consumption of material. Moreover, the enhanced rigidity of the lid sheet means that the punched lids do not curl after the punching.

[0025] Optionally, an additional layer with print/colour may be applied in a generally known manner, either before or after the punching of the lids, just as an additional barrier layer may optionally be applied to the lid sheet, e.g. prior to the coating and/or punching.

REFERENCES CITED IN THE DESCRIPTION

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- WO9825760A1 **[0001]**
- EP2108507A **[0001]**
- GB2370808A **[0004]**
- EP2108507A1 **[0004]**

P A T E N T K R A V

1. Fremgangsmåde til fremstilling af et udstanset folielåg (2) til emballage, såsom bægere af polypropylen, fra en folie, hvor folien er fuldstændigt transparent og omfatter en fuldstændigt transparent polyesterfolie (4), som er en PET-folie,

hvor fremgangsmåden til fremstilling af et udstanset folielåg er k e n d e t e g n e t ved, at

- folien fremstilles ved at coate den fuldstændigt transparente PET-folie (4) med et coekstruderet yderligere lag (5) ved at coekstrudere et polyethylenlag (5a) og et polypropylenlag (5b) ovenpå PET-folien (4), og hvor coekstruderingen af polyethylenlaget (5a) og polypropylenlaget (5b) ovenpå PET-folien (4) sker således, at polyethylenlaget (5a) ligger imellem PET-folien (4) og polypropylenlaget (5b),

- hvor fremgangsmåden omfatter trinnet at udstanse folielåget (2) til den endelige facon af det udstansede folielåg således, at polypropylenlaget (5b) kan svejses på polypropylenbægeret, hvor polypropylenlaget klæber til polypropylenbægeret.

2. Fremgangsmåde ifølge krav 1 k e n d e t e g n e t ved, at polyethylenlaget er i form af en homopolymer eller en copolymer af ethylen.

3. Fremgangsmåde ifølge krav 2 k e n d e t e g n e t ved, at polyethylenlaget er en copolymer af ethylen, som indeholder polypropylen-enheder.

4. Fremgangsmåde ifølge et hvilket som helst af kravene 1 til 3 k e n d e t e g n e t ved, at et primerlag påføres på PET-folien forud for påførelsen af det coekstruderede polyethylenlag (5a) og polypropylenlaget (5b).

5. Fremgangsmåde ifølge et hvilket som helst af kravene 1 til 4 k e n d e t e g n e t ved, at det udstansede folielåg (2) svejses på polypropylenemballage (1), hvor polypropylenlaget (5b) klæber til polypropylenemballagen (1).

6. Fremgangsmåde ifølge et hvilket som helst af kravene 1 til 5 k e n d e t e g n e t ved, at PET-folien (4) gives en tykkelse på mellem 23 og 50 µm, og at det coekstruderede lag (5) gives en mængde på mellem 8 og 20 g/m^2, som svarer til en tykkelse på mellem 9 og 22 µm.

7. Fremgangsmåde ifølge et hvilket som helst af kravene 1 til 6 k e n d e t e g n e t ved, at folielåget (2) udstanses før lukning af et bæger, og er således tilpasset i størrelse og facon til åbningen af bægeret.

8. Udstanset folielåg, der er opnået ved fremgangsmåden ifølge et hvilket som helst af kravene 1 til 7.

9. Anvendelse af et udstanset folielåg, som er fremstillet ved fremgangsmåden ifølge et hvilket som helst af kravene 1 til 8 som et folielåg af en polypropylenbeholder (1), hvor folielåget (2) er udstanset til den endelige facon af folielåget (2) forud påsvejsningen til beholderen (1),

hvor folielåget (2) er svejset til beholderen (1) med polypropylenlaget (5b), som udgør et svejselag, og som vender mod beholderen (1), hvor folielåget bevirker, ved en ef-

terfølgende adskillelse fra beholderen (1) ved at trække i folielåget (2), at polyethylenlaget (5a) forbliver på PET-folien (4), og at polypropylenlaget (5b) forbliver på polypropylenbæ-geret (3), mens polyethylen- og polypropylenlagene (5a og 5b) delaminerer.

DRAWINGS

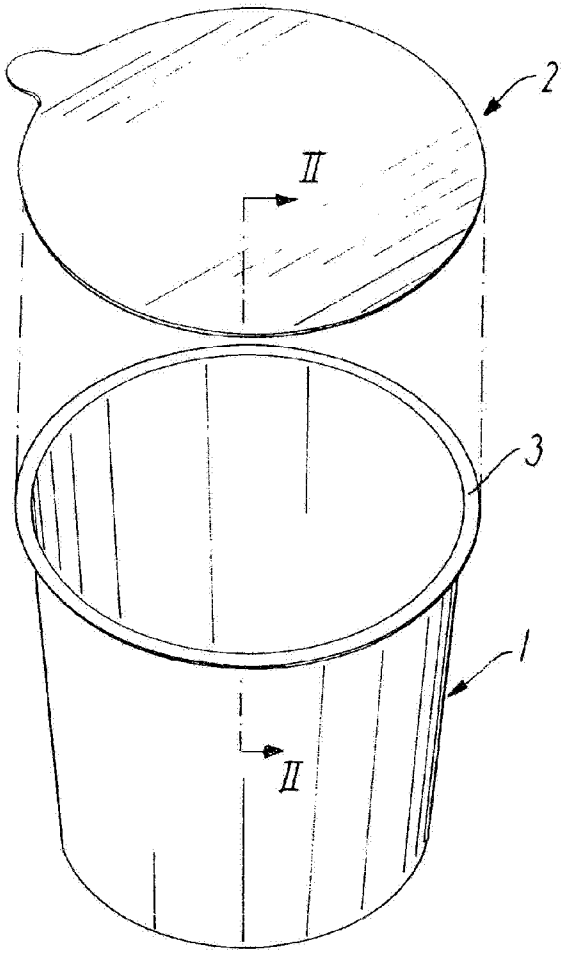

FIG. 1

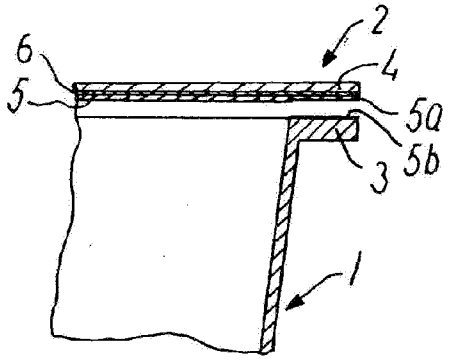

FIG. 2