

Alfelder Kunststoffwerke

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DESCRIPTION

Sealing disc

The invention relates to a sealing disc.

Sealing discs are known in various embodiments (DE 1 482 575, EP 0 148 527 B1, GB 2 142 911 A, US 4 266 687). They are made up of at least two layers. In most cases they are inserted as thin discs in the closure of a container. However thicker discs made of cardboard, e.g. duplex cardboard are also used, particularly for storing soluble coffee.

The sealing disc is inserted in the closure and the closure is screwed onto the container. The top peripheral edge of the container is coated with a permanent adhesive. Screwing down the closure onto the container causes one layer of the sealing disc, usually made of aluminium with a glassine lamination, to stick fast to the edge of the container at the glassine side. The contents of the container are thereby prevented from losing their quality, e.g. by losing aroma, drying out or absorbing water. When the container is opened the cardboard layer is detached from the aluminium layer. The aluminium/glassine layer is broken to reach the contents. The cardboard layer remains in the closure and seals the container again when it is reclosed, so as to protect the material stored in it.

Sealing discs which seal a container by induction or conduction through the action of heat are also known (US 5 057 365). For this purpose such discs have layers of thermoplastic material. When the closure provided with the sealing disc and screwed onto a container is heated, these

layers melt and form a strong bond with the bottom of the closure. When the closure is unscrewed from the container the thermoplastic layer remains in the closure.

The problem on which the invention is based is to provide an improved sealing disc.

The problem is solved by the invention defined in claim 1. Other embodiments are defined in the sub-claims. Thus a sealing disc free from the odour disadvantages of known discs of duplex cardboard is provided. If cardboard becomes moist, bacterial cultures form. These destroy the fresh smell and quality of the food stored in the container, e.g. soluble coffee. The improved sealing disc can surprisingly be produced at costs similar to those of known discs. The use of polypropylene foam in fact makes its density so low compared to that of cardboard that, in spite of the considerably higher price per kilogram (DM 4.00 per kg compared with DM 1.40 - 1.60 per kg) the final price is the same for both products. The rigidity or flexural strength of polypropylene can give the disc a good seat in the container closure. The action in compressing the polypropylene when the closure is screwed onto the container substantially corresponds to that of cardboard, so the sealing effect is optimal even when the container is reclosed after being opened for the first time.

Polypropylene can be recycled without leaving any residue, as can polyethylene. In known sealing discs made of duplex cardboard the cardboard is troublesome when the closures are recycled. Thus the sealing disc according to the invention has advantages in the disposal of used closures in addition to the already mentioned advantages of using polypropylene and polyethylene for the discs themselves.

The sealing disc provided basically comprises at least two layers and is provided for closing containers for holding odour-sensitive foods, particularly soluble coffee. It is particularly advantageous with closures for instant products in glass containers. One of the layers is then made of polypropylene. Since polypropylene is not sensitive to moisture or hydrophilic it is particularly suitable for sealing foods which are themselves hydrophilic, such as soluble coffee. When the container has been opened for the first time the polypropylene layer faces towards the product in it. As a polypropylene foam is generally used, it has a degree of rigidity which



enables it to be compressed by the top peripheral edge of the container when the closure is screwed on.

A second layer is arranged on the first layer of polypropylene, facing towards the closure. It may be either of polypropylene again or of polyethylene. Conventional wax may also be used instead of a layer of polypropylene. When sealing the container in airtight manner for the first time, an aluminium film coated with glassine or the like or a layer comprising two superimposed glassine layers may be used and superimposed on the polypropylene layer. This may, for example, be done by means of a temporary adhesive. When the container is opened the layers (polypropylene/wax, aluminium and/or glassine) are separated, leaving the aluminium/glassine layer on its top peripheral edge. That layer is then removed from the edge of the container in the usual way, and only the disc inserted in the closure, then comprising two layers only, tightly seals the container. The polypropylene layer is separated from the aluminium/glassine or glassine/glassine layer by means of the central layer, made e.g. of wax.

For more detailed explanation of the invention some examples of sealing discs will now be described with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a container with a sealing disc according to the invention,

Fig. 2 is a perspective view of a second embodiment of a sealing disc according to the invention and

Fig. 3 is a perspective view of a third embodiment of a sealing disc according to the invention.

Referring to Fig. 1, this is a perspective view of a container 1 with a sealing disc 2. The disc 2 is arranged in a closure 3 of the container 1. The closure 3 is screwed onto the top peripheral edge 4 of the container 1. The screw closure 5 is only indicated. However a different rotary closure could be used instead of the closure 5. The sealing disc 2 is arranged in a retaining bead 20 provided in the closure 3. An odour-sensitive food 6, especially instant products and in this case soluble coffee, is stored in the container 1. However a different product, for example a hydrophilic one, may be stored in the container.



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The sealing disc 2 has two layers 2a, 2b. The upper layer 2a, facing towards the closure 3, is made of polypropylene or polyethylene. The lower layer 2b, facing towards the odour-sensitive food 6, is made of polypropylene. It may alternatively be made of wax if the layer 2a is of polypropylene. Fig. 1 shows the situation where the sealing disc 2 is made up only of these two layers 2a, 2b. Two additional layers are usually provided for packing in the factory. They are joined detachably to the first two layers 2a, 2b and stuck to the top peripheral edge of the container 1. They may, for example, be made of glassine-coated aluminium or of glassine. The aluminium and/or glassine may be printed with the manufacturer's name. When the container 1 is opened for the first time these two layers are detached from the first two layers 2a, 2b and from the container and remain on the edge of the container. The layers of glassine/glassine or aluminium/glassine are detached from the first two layers by virtue of the weaker temporary adhesive force prevailing between them and the first two layers 2a, 2b. This temporary adhesive force is in fact weaker than the permanent adhesive effect of the glassine/glassine or aluminium/glassine layers stuck to the edge of the container.

These layers are thereupon broken by the end consumer of the product in reaching the product stored in the container 1, here the odour-sensitive food 6. The sealing effect is then provided by the two-layer sealing disc 2 of polypropylene and polypropylene or polyethylene or wax. Airtight sealing of the container 1 is no longer necessary by that time, as the product already came into contact with air when the aluminium and/or glassine layers were first broken.

Fig. 2 is a perspective view of a second embodiment of a sealing disc 2. This disc has five layers. Two layers 7, 8 are shown partly detached. The sealing disc 2 is constructed as follows. A central disc 2a is provided. This is advantageously made of polyethylene or polypropylene. If it is made of polypropylene, a foam of this material is provided, e.g. with a density of 200 g/m^2 . A mixture of copolymers and homopolymers may be used. This gives the layer 2a flexibility and stiffness such that the disc 2 can be inserted in a retaining bead in the closure 3 in Fig. 1 without any danger of slipping out again. The elasticity of the polypropylene foam is not particularly high though, as recovery is too low. However this is

not a disadvantage, as the airtight first sealing of the container is already effected by the layers 7 and 8. When the container has been opened, i.e. when the layers 7 and 8 have been broken, air has already reached the product in the container. The sealing action of the polypropylene is then quite adequate. In spite of the high price per kilogram of choice-quality polypropylene, the use of low-density foam means that the price per square metre is the same as in the conventional use of cardboard.

If polyethylene is provided instead of polypropylene a foam may again be used, but a higher-density one, e.g. of 400 g/m². Polyethylene should always be processed in a thickness adapted to the material, i.e. not too thinly. But neither should the layer be too thick, in order to obtain suitable flexibility. Good results have been obtained with a layer 1 mm thick.

The layer 2a is coated with a layer 2b on both sides. This is usually a polypropylene coating. However, if polypropylene foam is used for the central layer 2a a known wax coating may be applied. The layer 2b, facing upwards towards the layer 8 in Fig. 2, faces towards the product in the container 1 when the sealing disc 2 has been inserted in the closure 3 thereof. The actual airtight sealing of the container 1 is effected by the two layers 7, 8 in the factory. The layer 8 may, for example, be made of aluminium or glassine, and the layer 7 of glassine. When the closure 3 is screwed onto the container 1 the glassine layer 7 is pressed against and stuck to its glued top peripheral edge 4. The glassine layer 7 and aluminium layer 8 are also joined together, for example by permanent adhesion. The aluminium layer 8 has grid patterns 9 or incisions in its surface facing towards the layer 2b. These are shaped so that the aluminium layer 8 pressed onto the layer 2b is fastened to it. But when the closure 3 is unscrewed from the container 1 the first time it is opened, the layer 8 is separated from the layer 2b by virtue of the stronger effect of the permanent adhesive between the glassine layer and the edge of the container and between the glassine layer and the aluminium or glassine layer, compared to the adhesive effect of the grid pattern 9 in the aluminium or glassine layer 8 relative to the layer 2b above it.

A perspective view of a third embodiment of a sealing disc 2 is shown in Fig. 3. The disc structure is substantially the same as in Fig. 2 in respect of the material. But instead of having two layers 2b above and below the layer 2a, in Fig. 3 a layer 2b is provided above the layer 2a,

and a layer 2c of a different material below it. The central layer 2a may, for example, be of polyethylene, the upper layer 2b of polypropylene and the lower layer of wax.

The aluminium or glassine layer is again shown partly pulled off the layer 2b. It is joined to it by droplets 10 of a temporary adhesive located on both surfaces. This replaces the grid pattern 9 in the aluminium layer 8 illustrated in Fig. 2. The droplets fulfil the same purpose, detachably joining the layers 8 and 2b when the closure 3 is screwed onto the container 1.

An annular portion 12 is marked on the surface 11 of the glassine layer 7; when the closure is screwed onto the top peripheral edge 4 this portion is joined or stuck to the edge.

The multiple-layer sealing discs according to the invention are fixed to the edge of the container in order to seal it, without any heating action. The permanent adhesive cures without any heating.

When the closure is twisted off the container for the first time the aroma protection is still present, in the form of the layers 7, 8. This gives the consumer a good way of checking that the food is in its original pack. If the layers 7, 8 are already broken this will immediately be clearly visible to him.

The force required to separate the layers remaining on the edge of the container and in the closure is slight, corresponding to the adhesive effect.



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CLAIMS

1. A sealing disc comprising at least two layers (2a, 2b) for the closure (3) of containers (1) to hold odour-sensitive foods (6), hydrophilic products or the like, particularly soluble coffee, characterised in that

one of the layers (2a, 2b) is made of polypropylene,

that another layer (2a) is made of polyethylene, polypropylene or wax,

that one layer (2b) of polypropylene is secured in the closure (3) by clamping, and

that other layers (7, 8) are provided, which are separated from the layers (2a, 2b) and remain on the top peripheral edge (4) of the container (1) when the container is opened for the first time.

2. A sealing disc according to claim 1,

characterised in that

the other layers (7, 8) are made of aluminium, glassine or the like.

3. Sealing discs according to claim 1 or 2,

characterised in that

the polypropylene layer (2b) is arranged facing towards the container (1).

4. A sealing disc according to claim 1,

characterised in that

the polyethylene, polypropylene or wax layer (2a, 2b, 2c) is arranged facing towards the closure (3) of the container (1).

5. A sealing disc according to claim 1,

characterised in that

the aluminium layer (8) is arranged facing towards the polypropylene layer (2b) or the wax layer (2c).

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6. Sealing discs according to claim 2,
characterised in that
the glassine layer (7) is arranged facing towards the odour-sensitive food (6), hydrophilic product or the like, and the layer (8) of aluminium or the like may be or is fixed on the polypropylene layer (2b) by a temporary adhesive (10).
7. A sealing disc according to any of claims 1 to 6,
characterised in that
the layer (7) may be or is attached to a top peripheral edge (4) of the container (1) by a permanent adhesive (12).
8. A sealing disc according to any of the preceding claims,
characterised in that
a polypropylene foam or a foam of mixed copolymers and homopolymers on polypropylene is provided.
9. Sealing discs according to any of claims 1 to 8,
characterised in that
the sealing disc (2) is used for rotary closures, screw closures or the like, where it may be or is inserted and clamped in a retaining bead (20) or the like in the closure (3).
10. A sealing disc according to any of claims 1 to 9,
characterised in that
the polypropylene foam has a density of 200 g/m^2 ,
that the polyethylene foam has a density of 400 g/m^2 and
that the polypropylene or polyethylene layer (2a) has a thickness of 1 mm.

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