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(54) Container.

(57) A container (1) is formed from resilient plastics material and comprises a body portion having a substantially circular mouth opening, and a substantially circular lid (2) which makes a plug fit in said mouth opening. The lid (2) has a downwardly projecting, upwardly opening, substantially U-shaped annular channel (3) around its perimeter, the bottom wall of said channel (3) having a thickness in the range 0.6 to 0.8 mm. The outwardly facing wall (11) of the said channel (3) is formed with an annular recess (10) arranged to receive cooperating inwardly projecting securing means (12) in the container mouth.

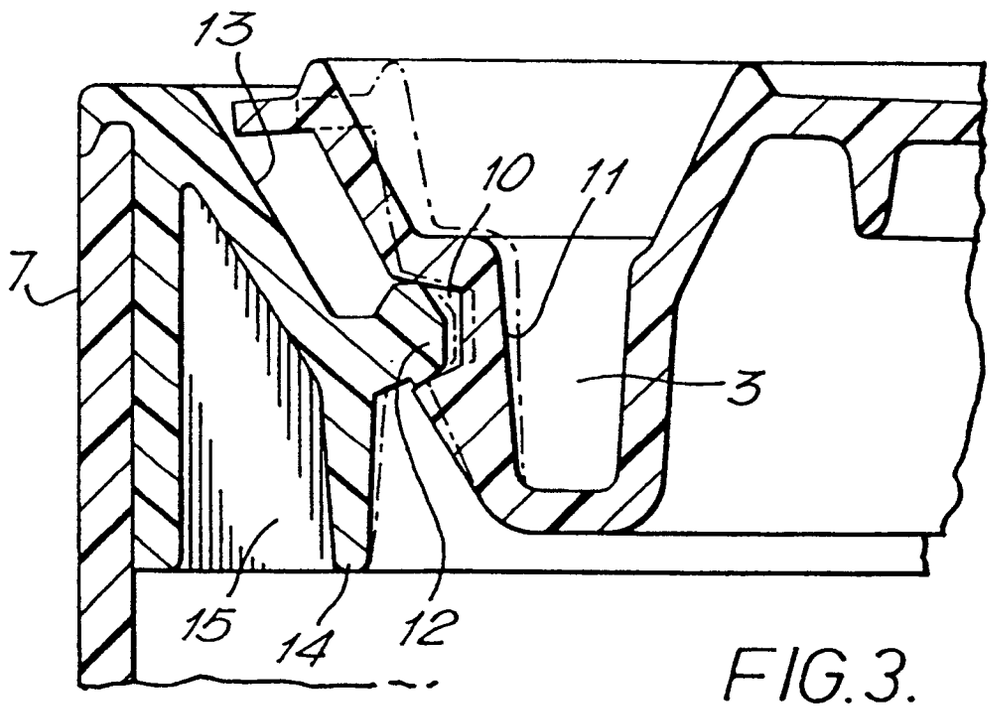

FIG.3.

EP 0 446 026 A2

CONTAINER

This invention relates to containers of the kind formed from resilient plastics material and to lids for use with such containers.

Plastics containers have for some time been used for the transportation and storage of various liquid substances, for example paint, which are sealed in the containers by means of a removable lid. Such containers are popular because of their light weight and because they do not rust, as compared to metal containers.

Plastics containers do however suffer from a problem resulting from their inherent flexibility, namely that if dropped onto a hard surface, the body of the container tends to deform in shape, with the impact area being compressed inwards and the other parts bulging outwards. However, the lid, which is generally less flexible, deforms less and can consequently pop out, allowing the contents of the container to escape.

Viewed from one aspect the present invention provides a container formed from resilient plastics material, comprising a body portion having a substantially circular mouth opening, and a substantially circular lid which makes a plug fit in said mouth opening, the lid having a downwardly projecting, upwardly opening, substantially U-shaped annular channel around its perimeter, the bottom wall of said channel having a thickness in the range 0.6 to 0.8 mm, and the outwardly facing wall of the said channel being formed with an annular recess arranged to receive cooperating inwardly projecting securing means in the container mouth.

The flexibility of the U-shaped annular channel in the lid of the container enables that part of the lid to conform more readily to the shape of the container when the container is deformed by external forces, while at the same time the securing means ensures that the lid is held firmly in place.

In a preferred embodiment of the invention the recess in the outwardly facing wall of the U-shaped channel is situated towards the top of the U. Thus the recess is situated in substantially the most flexible part of the outwardly facing wall of the U.

Preferably the said securing means is an annular securing bead which extends inwardly around the container mouth to provide continuous engagement with the recess in the outwardly facing wall of the U-shaped channel.

Preferably the annular securing bead is connected to the container wall by means of an annular support structure, said support structure being attached to or formed integrally with the edge of the container mouth so as to extend inwardly at an angle of 90° or less relative to the inside wall of the container.

It is further preferred that the annular support structure has at least one annular flange, said flange extending from the edge of the container mouth parallel to and in contact with the inside wall of the container. Such an arrangement increases the resilience of said support structure thus strengthening the wall of the container in the vicinity of its mouth and reducing its susceptibility to deformation in that area.

Preferably the annular resilient support structure has a further concentric annular flange. Preferably a plurality of strengthening ribs are provided which extend between the two concentric annular flanges. Such an arrangement further strengthens the wall of the container in the vicinity of its mouth and thus reduces the propensity of annular securing bead to flex.

In a preferred embodiment of the invention the lid of the container is provided with at least one slot in its perimeter for the insertion of a tool between the lid and the container, to remove the lid from the container. Preferably, the bottom wall of the U-shaped channel has a thickness of 0.75 mm. At this thickness the ability of the U-shape channel to flex, for example in response to the insertion of a tool between the lid the container, is optimised. It is further preferred that strengthening ribs are provided in the U-shaped channel, adjacent the or each said slot, to facilitate removal of the lid by a tool inserted in the slot.

Viewed from another aspect the present invention provides a substantially circular lid formed from resilient plastics material for use with a container having a substantially circular mouth opening, the lid having a downwardly projecting, upwardly opening, substantially U-shaped annular channel around its perimeter, the bottom wall of said channel having a thickness in the range 0.6 to 0.8 mm, and the outwardly facing wall of the said channel being formed with an annular recess to receive co-operating inwardly projecting securing means in the container mouth.

An embodiment of the invention will now be described by way of example and with reference to the accompanying drawings, wherein:-

Figure 1 is a partial end view of a container and lid according to the invention, seen undergoing impact with a flat surface;

Figure 2 is an enlarged cross sectional view taken line A-A of Figure 1;

Figure 3 is an enlarged cross sectional view taken on line B-B of Figure 1; and

Figure 4 is an enlarged cross sectional view of a container and lid according to the invention, seen in their normal state.

Referring to Figure 1, a container 1, shown end on, is made from polypropylene and has a polypropylene lid 2 formed with a U-shaped angular channel 3 around its perimeter. The lid 2 is further formed

with three equally spaced slots 4, in which a tool can be inserted to remove the lid 2, and strengthening ribs 5, adjacent the slots, which facilitate the removal of the lid 2 by means of such a tool. The slots 4 may be covered with a membrane which is broken when a tool is inserted. Thus, this can indicate whether the container has been tampered with.

Figure 1 shows the container 1 upon impact with a flat surface 6. The broken lines indicate the position of the wall 7 of the container 1 before impact and the solid lines show its position upon impact. From Figure 1 it can clearly be seen that the wall 7 of the container 1 in the vicinity of the impact, shown generally at 8, is compressed inwards while the wall 7 at some distance away from the area of the impact, shown generally at 9, bulges outwards.

With known kinds of plastics containers the lid, because it is stiffer than the container wall, does not deform to the same extent as the wall and consequently tends to pop out when the container is dropped in the manner indicated in Figure 1.

As can be seen from Figures 2 and 3, the U-shaped annular channel 3 has an annular recess 10 in its outwardly facing wall 11 which engages with an annular inwardly projecting bead 12 extending around the open mouth of the container, the bead being carried from the inside of the container wall 7 by an annular support structure 13.

As shown in Figure 2, in the immediate area of impact the wall 7 is compressed inwards, causing the support structure 13 to move the annular securing bead 12 inwards and downwards relative to the recess 10, which results in the wall 11 of the channel 3 being flexed inwards.

As can be seen from Figure 3, the opposite happens some distance away from the area of impact. Thus the wall 7 moves outwards causing the annular bead 12 to move upwards and outwards relative to the recess 10 in the wall 11, which simultaneously flexes outwards and downwards towards the bead 12. Thus the wall 11 remains in contact with the securing bead 12 due to the wallsflexibility and lid 2 stays in place.

The annular bead 12 need not be connected to the container wall by an annular support. It could, for example, be formed directly on the inside of the container wall 7. However, the support does strengthen the container wall 7 in the area of its mouth and thus helps reduce its susceptibility to deformation.

The support structure 13 of the annular bead 12 is formed with a plurality of annular flanges 14, one of which is in contact with the container wall 7. These flanges 14 further strengthen the container wall 7 in the area of its mouth and thus help reduce the amount of deformation experienced by the wall 7 upon impact with the surface. In addition these flanges 14 also enhance the resilience of support structure 13.

A plurality of strengthening ribs 15 are provided between the annular flanges 14 to reduce the compressibility of the flanges and hence increase the resistance to deformation of the container wall 7 still further.

The bottom wall of the U-shaped channel 3 has a thickness in the range 0.6 to 0.8 mm. To make it less than 0.6 mm is not practical, and at more than 0.8 mm difficulties could be experienced when trying to remove the lid 2 by the insertion of a tool between the lid 2 and the container 1, because the channel 3 is not flexible enough. The optimal and thus preferred value of the bottom wall thickness is 0.75 mm.

Figure 4 shows an enlarged cross-sectional view of a container 1 and lid 2 in their normal state. In this Figure the broken lines indicate the positions of the walls 7 and 11 upon impact and the solid lines indicate their positions under normal conditions.

The U-shaped channel may be provided with additional strengthening ribs. These ribs provide resistance against bending of the lid so as to maintain lid flatness. This aids the dispensing of lids onto containers on automatic filling lines.

Claims

1. A container formed from resilient plastics material, comprising a body portion having a substantially circular mouth opening, and a substantially circular lid which makes a plug fit in said mouth opening, the lid having a downwardly projecting, upwardly opening, substantially U-shaped annular channel around its perimeter, the bottom wall of said channel having a thickness in the range 0.6 to 0.8 mm, and the outwardly facing wall of the said channel being formed with an annular recess arranged to receive cooperating inwardly projecting securing means in the container mouth.

2. A container as claimed in claim 1, wherein the recess in the outwardly facing wall of the U-shaped channel is situated towards the top of the U.

3. A container as claimed in claim 1 or 2, wherein the said securing means is an annular securing bead which extends inwardly around the container mouth to provide continuous engagement with the recess in the outwardly facing wall of the U-shaped channel.

4. A container as claimed in claim 3, wherein the annular securing bead is connected to the container wall by means of an annular support structure, said support structure being attached to or formed integrally with the edge of the container mouth so as to extend inwardly at an angle of 90° or less relative to the inside wall of the container.

5. A container as claimed in claim 4, wherein the annular support structure has at least one annular flange, said flange extending from the edge of the container mouth parallel to and in contact with the inside wall of the container.

6. A container as claimed in claim 5, wherein the annular resilient support structure has two concentric annular flanges.

7. A container as claimed in claim 6, wherein a plurality of strengthening ribs are provided which extend between the two concentric annular flanges.

8. A container as claimed in any one of the preceding claims, wherein the bottom wall of the U-shaped channel has a thickness of 0.75 mm.

9. A container as claimed in any one of the preceding claims, wherein the lid of the container is provided with at least one slot in its perimeter for the insertion of a tool between the lid and the container, to remove the lid from the container.

10. A container as claimed in claim 9, wherein strengthening ribs are provided in the U-shaped channel, adjacent the or each said slot, to facilitate removal of the lid by a tool inserted in the slot.

11. A container as claimed in claim 9 or 10, wherein the or each slot is covered by a membrane which is breakable on insertion of a tool to indicate tampering therewith.

12. A container as claimed in any preceding claims wherein a plurality of strengthening ribs are provided in the U-shaped channel.

13. A substantially circular lid formed from resilient plastics material for use with a container having a substantially circular mouth opening, the lid having a downwardly projecting, upwardly opening, substantially U-shaped annular channel around its perimeter, the bottom wall of said channel having a thickness in the range 0.6 to 0.8 mm, and the outwardly facing wall of the said channel being formed with an annular recess to receive co-operating inwardly projecting securing means in the container mouth.

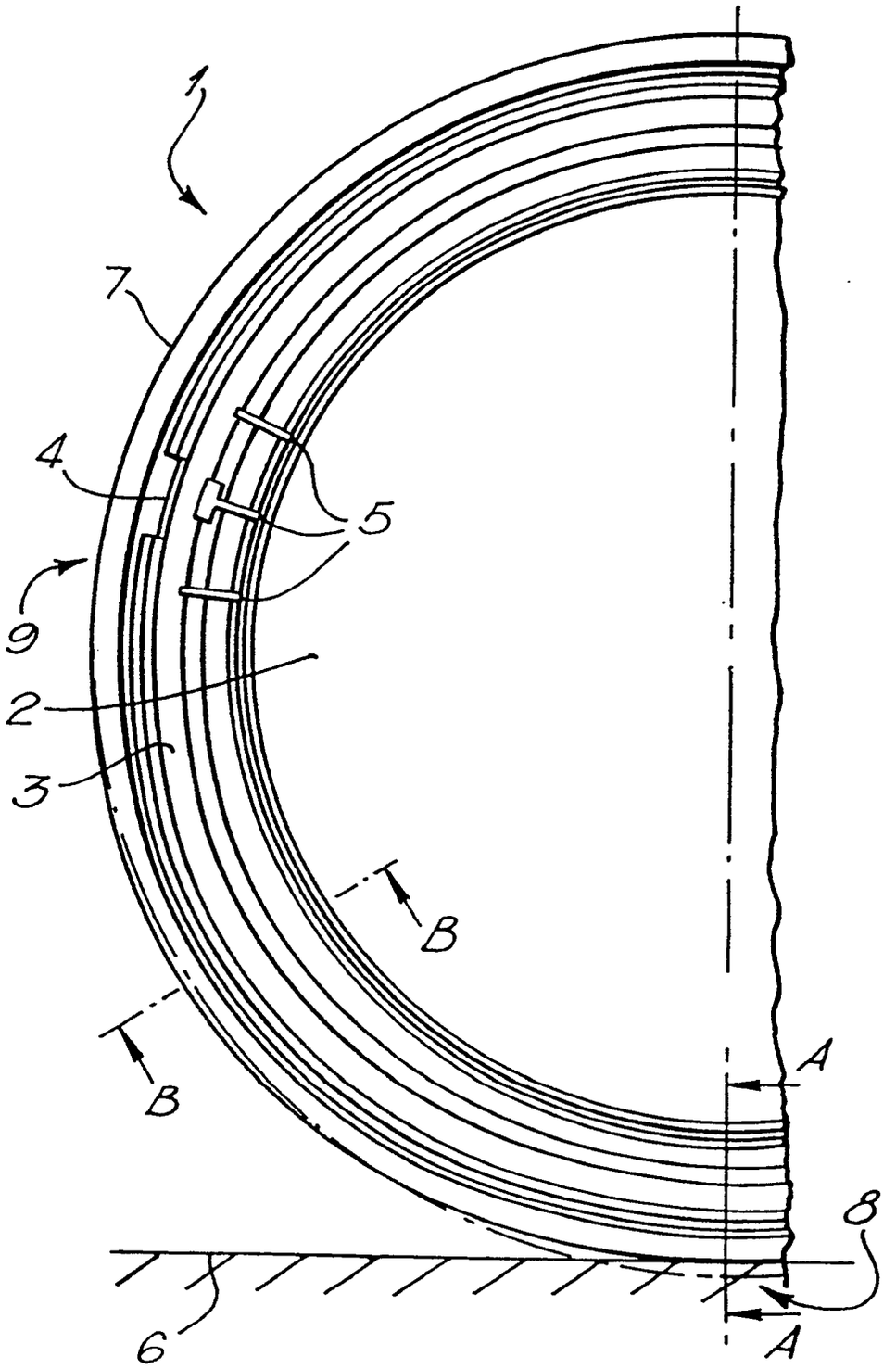

FIG. 1.

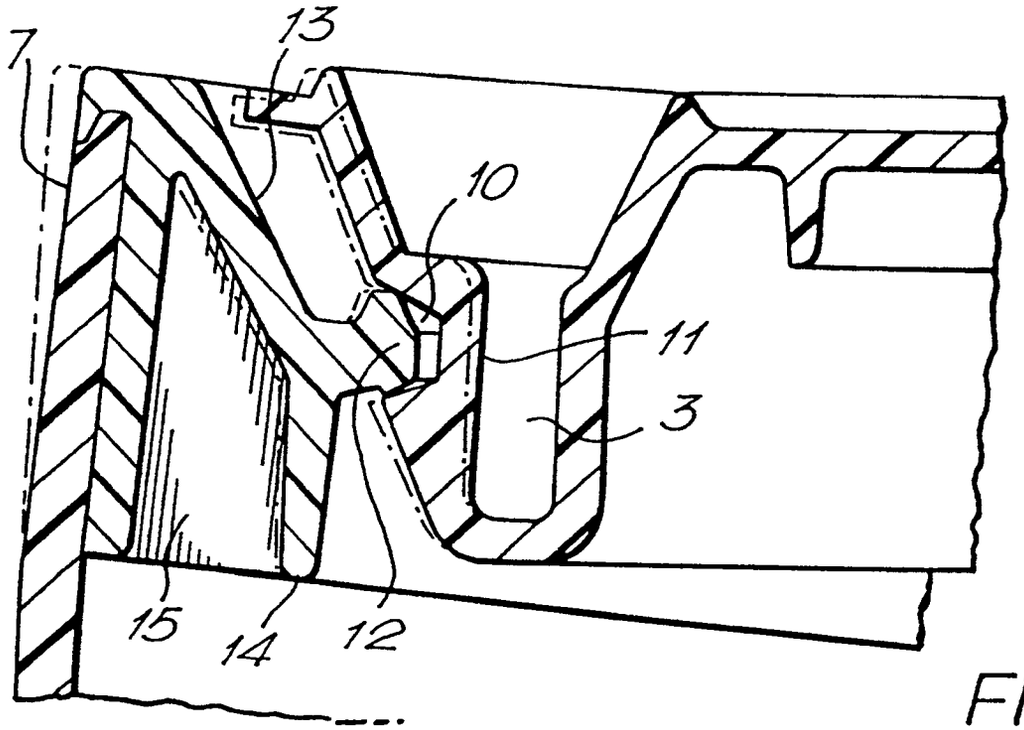

FIG.2.

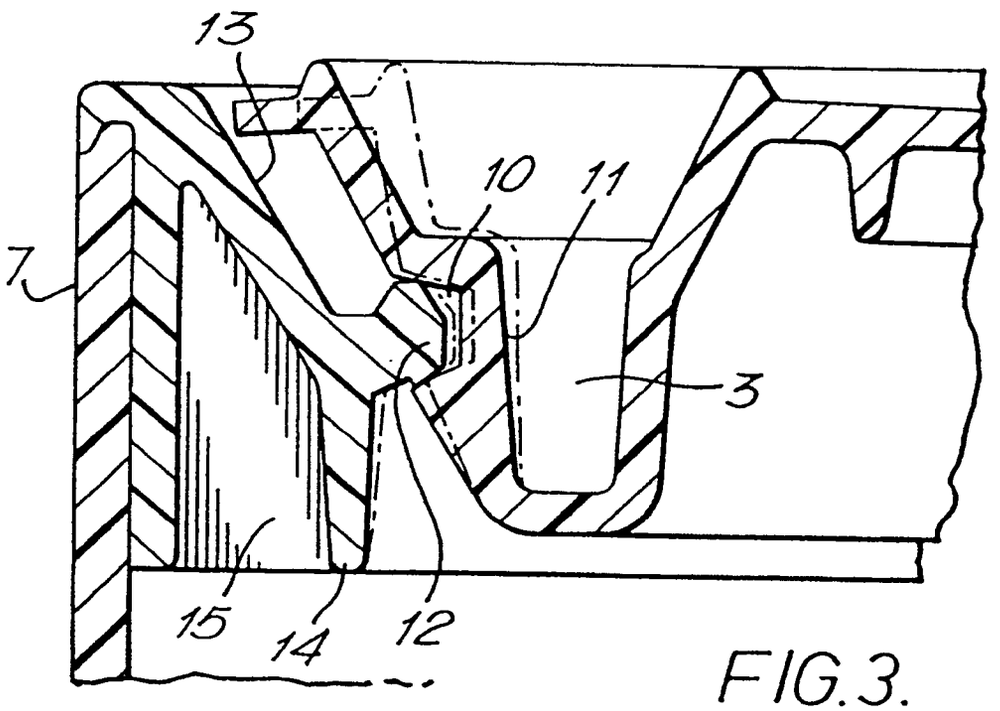

FIG.3.

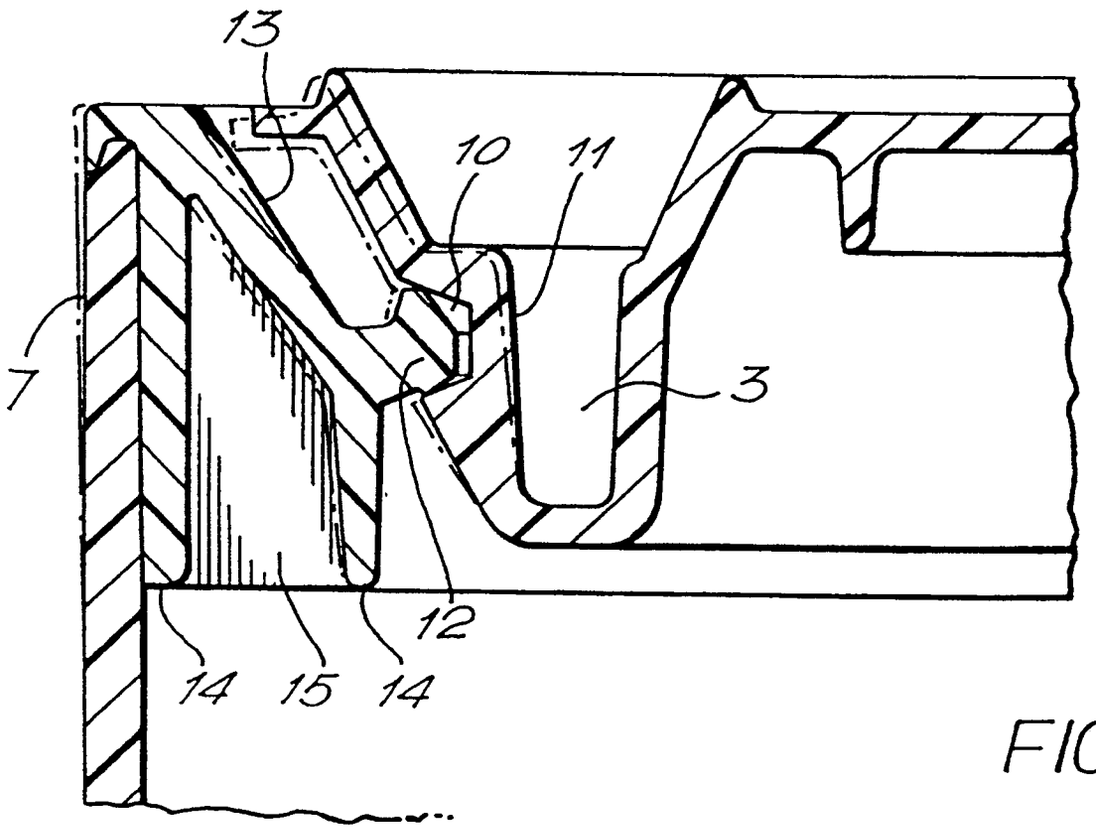

FIG.4.