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McGill (43) **Pub. Date: Dec. 2, 2004**(54) **CONTAINER WITH OUTLET**(30) **Foreign Application Priority Data**(76) **Inventor: Shane Robert McGill, West Malling**
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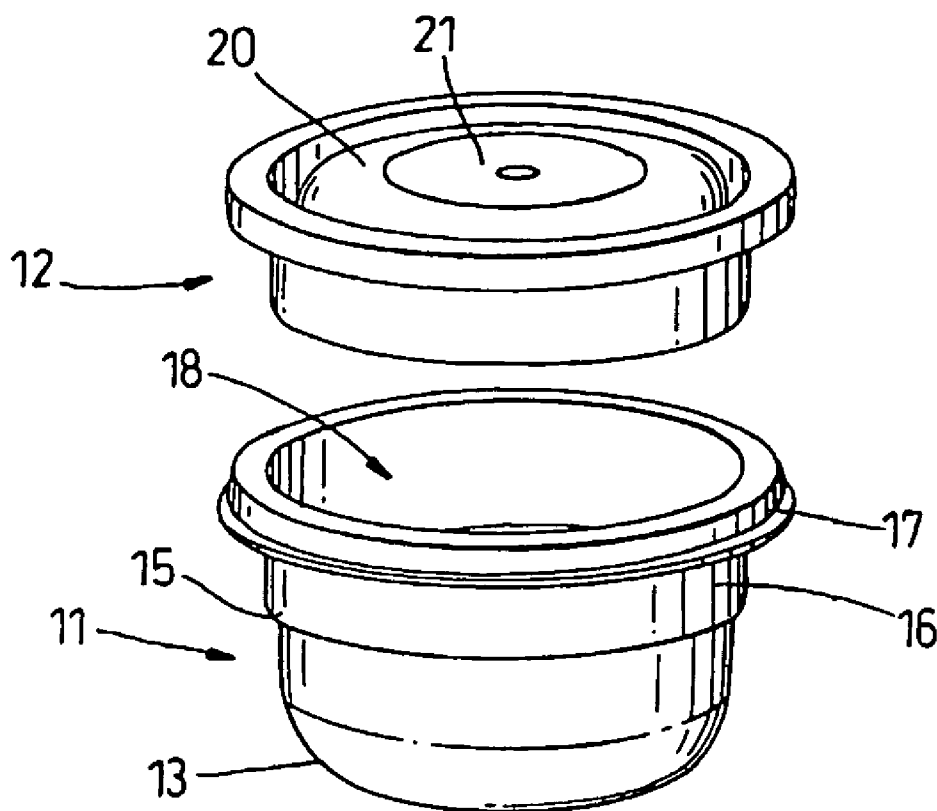
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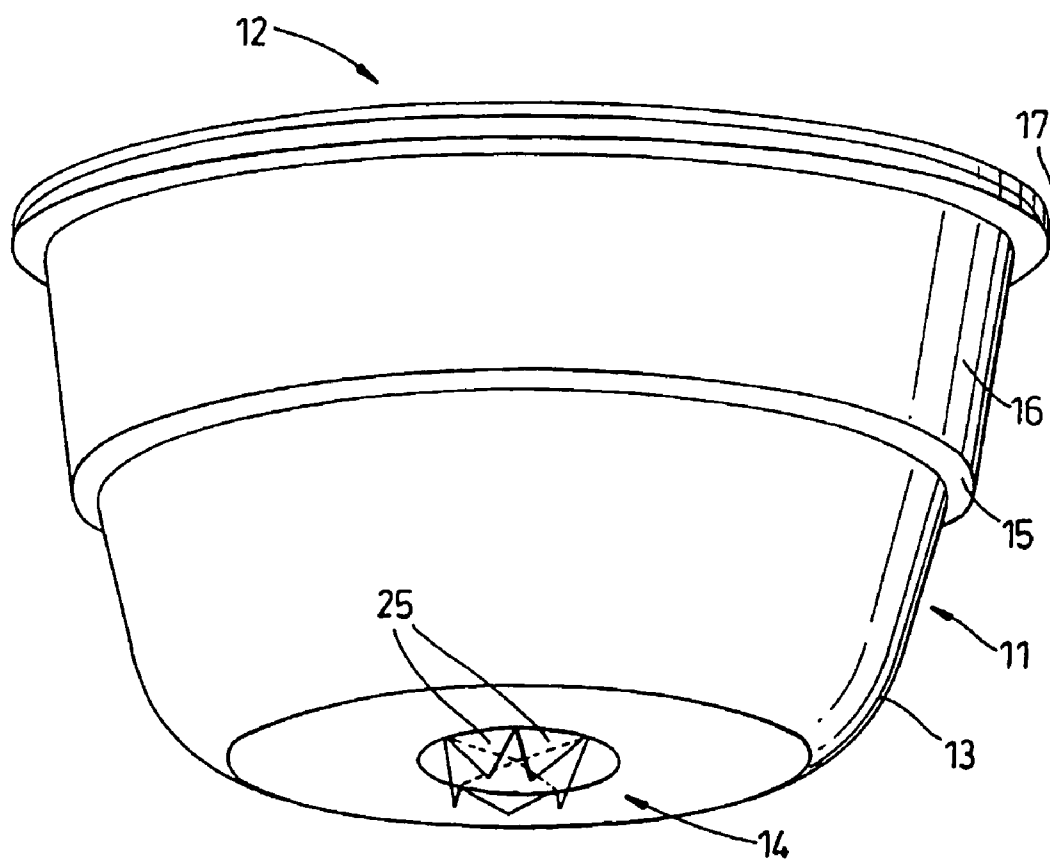
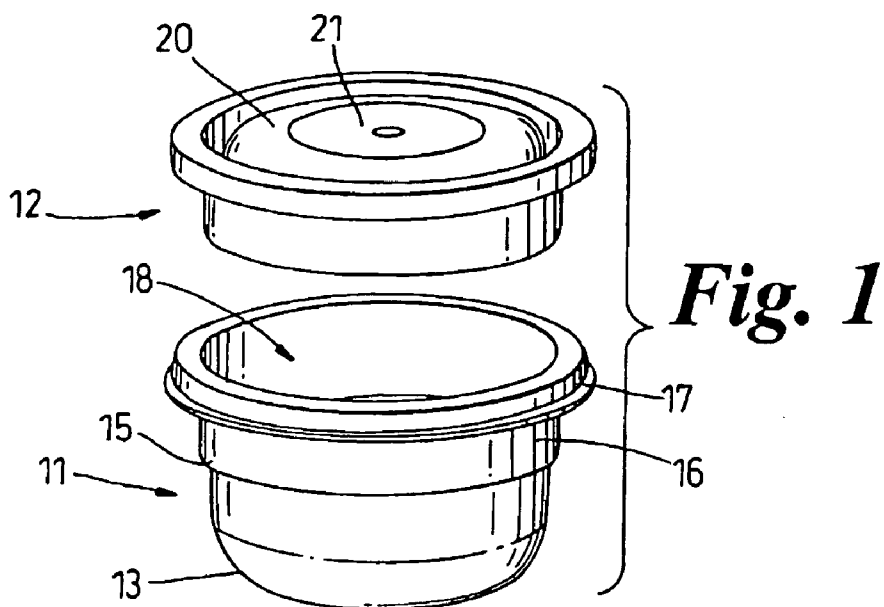
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(51) **Int. Cl.⁷** **B65D 5/72**
(52) **U.S. Cl.** **222/495**(57) **ABSTRACT**

A container is arranged to be particularly suited to food products which are discharged from the container by extrusion through an outlet (14). The outlet shapes the product as it is extruded and is made up of moveable portions (25) whose extent of movement is limited by limiting means (28, 29) so that the portions (25) still lie across the path of product extruding through the opening (14).

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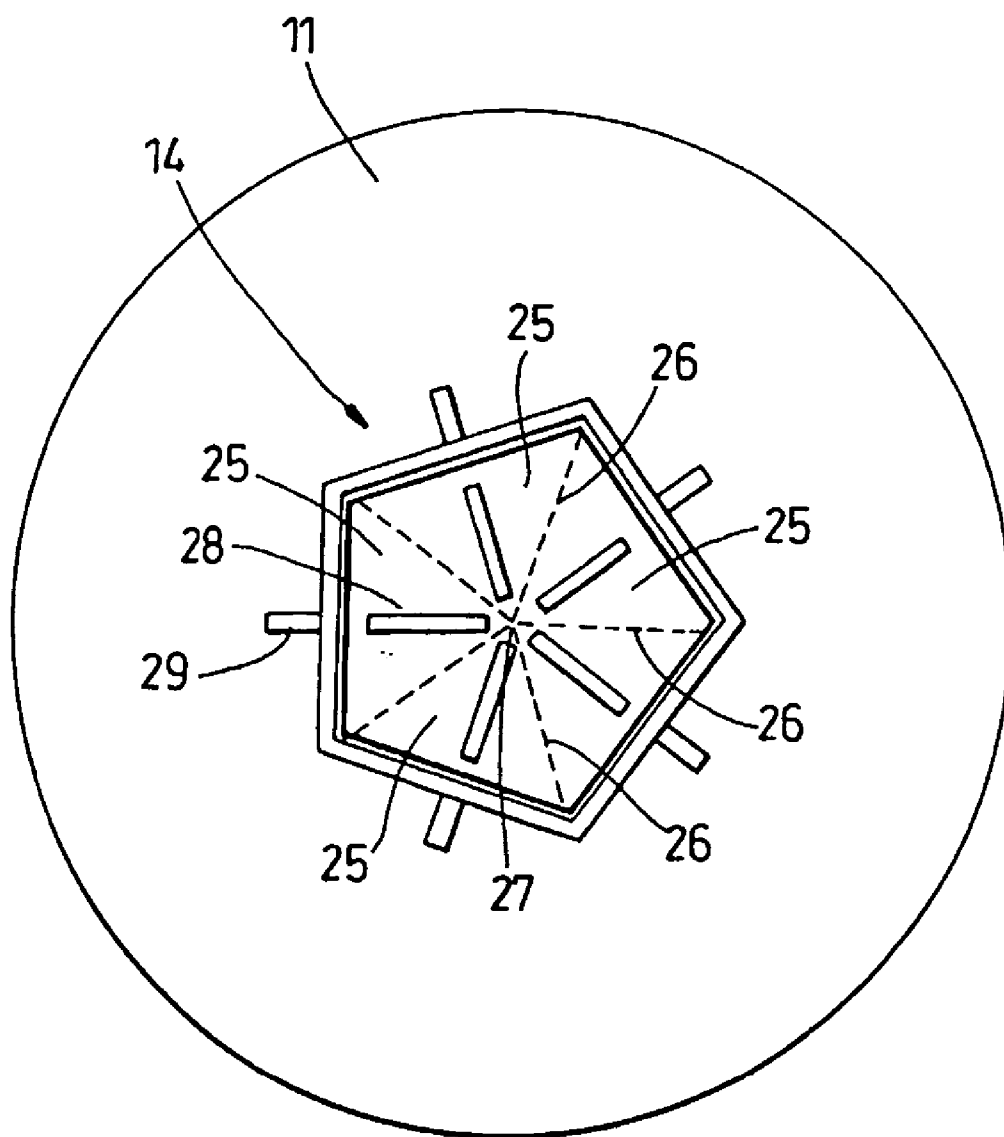


Fig. 3

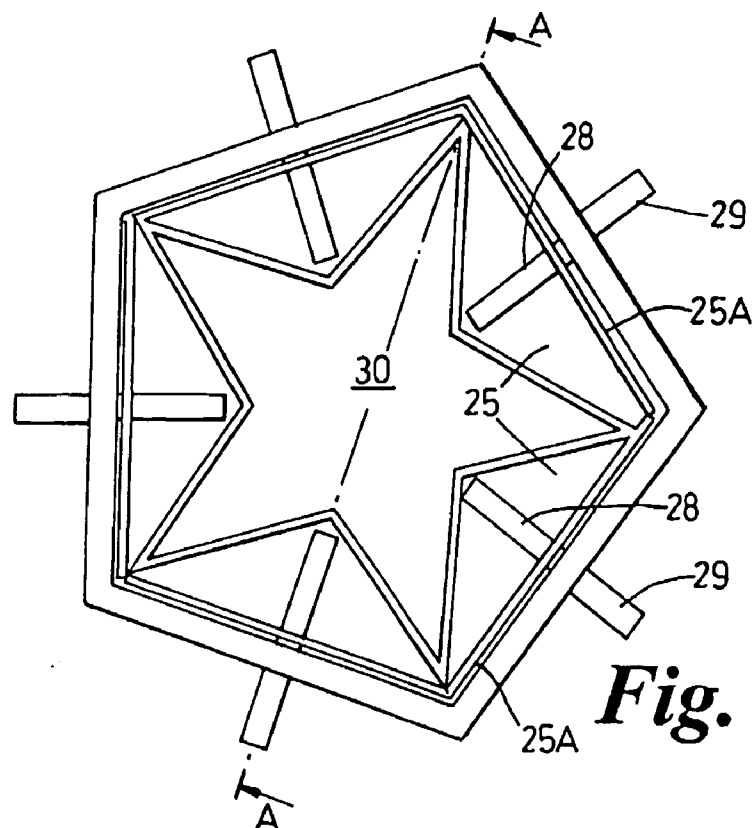


Fig. 4

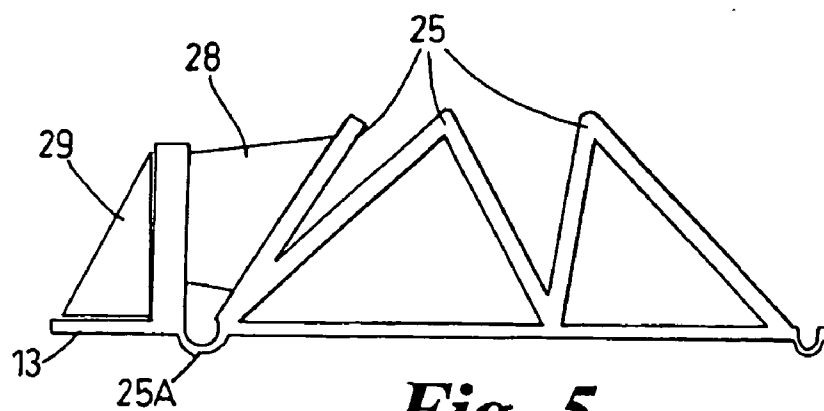


Fig. 5

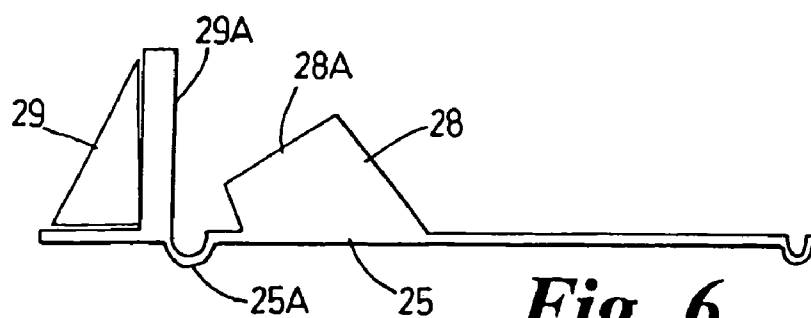


Fig. 6

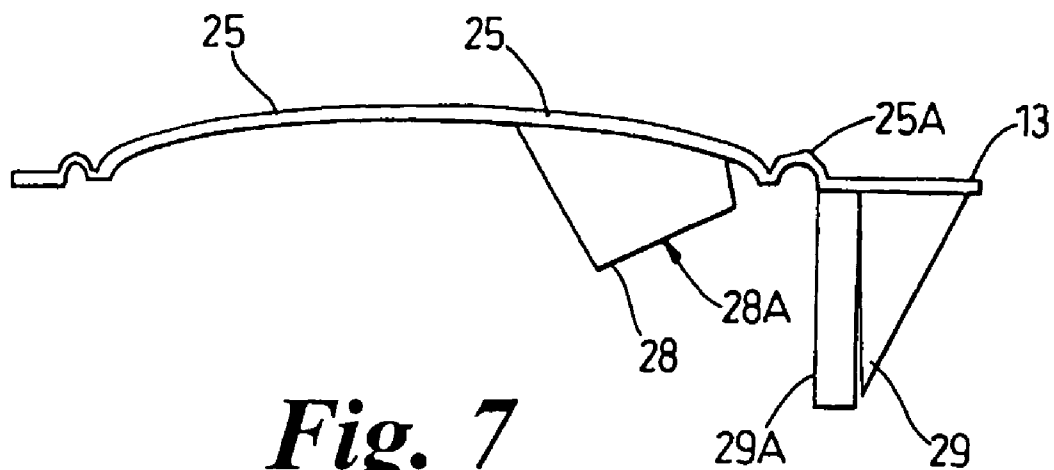


Fig. 7

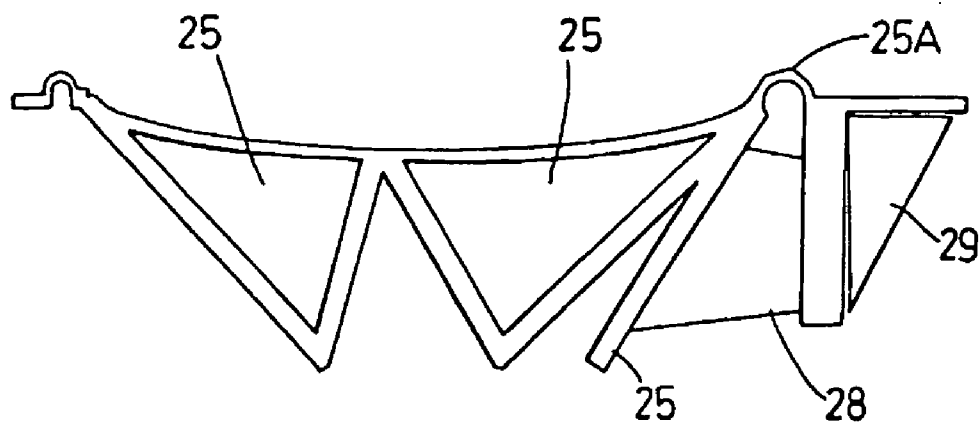


Fig. 8

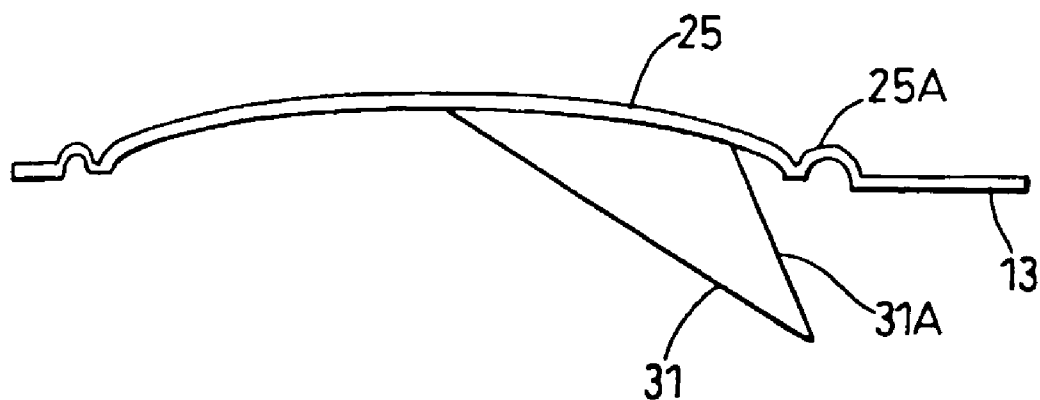


Fig. 9

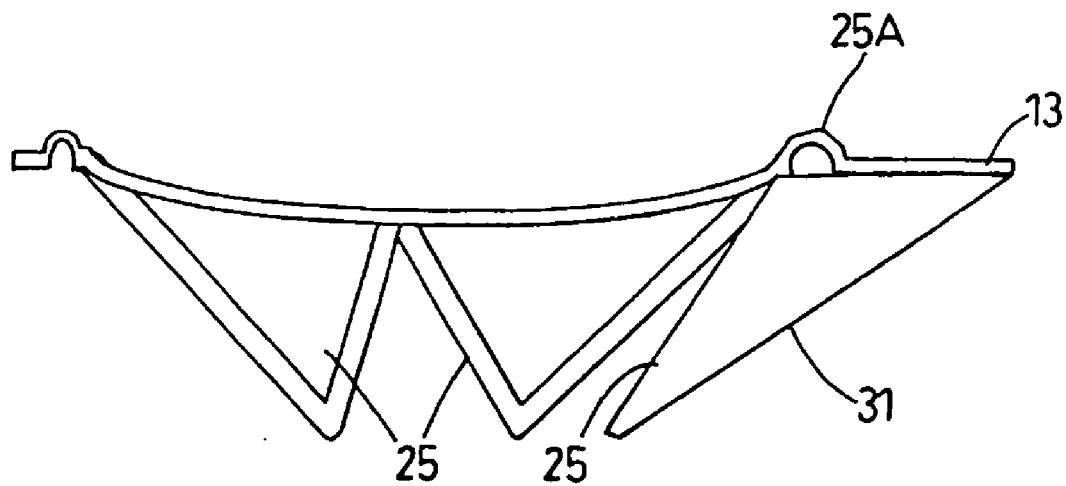


Fig. 10

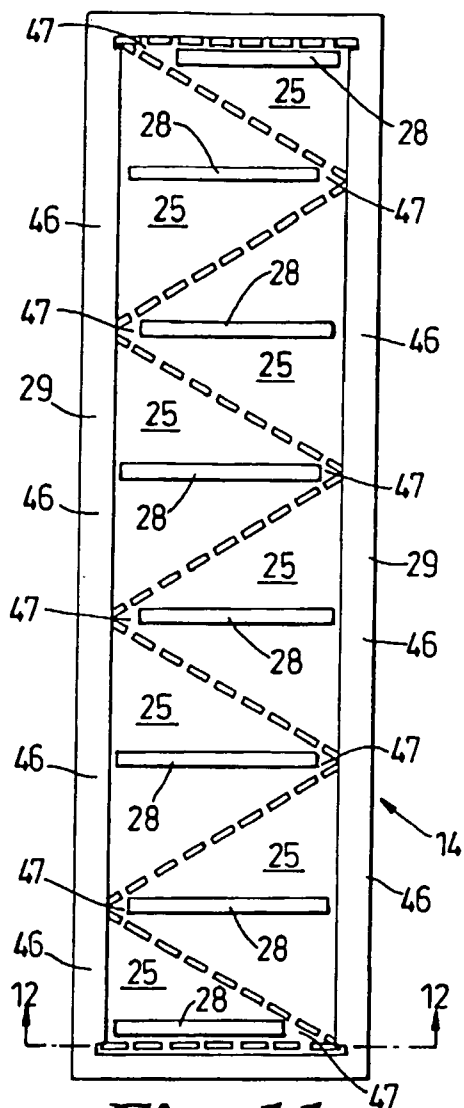


Fig. 11

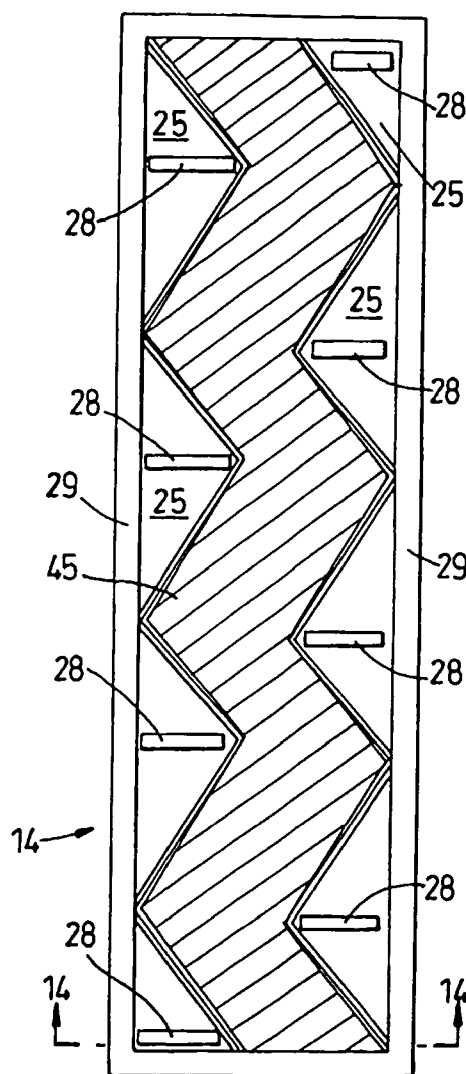


Fig. 13

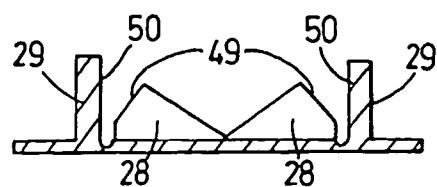


Fig. 12

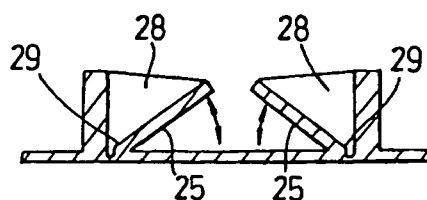


Fig. 14

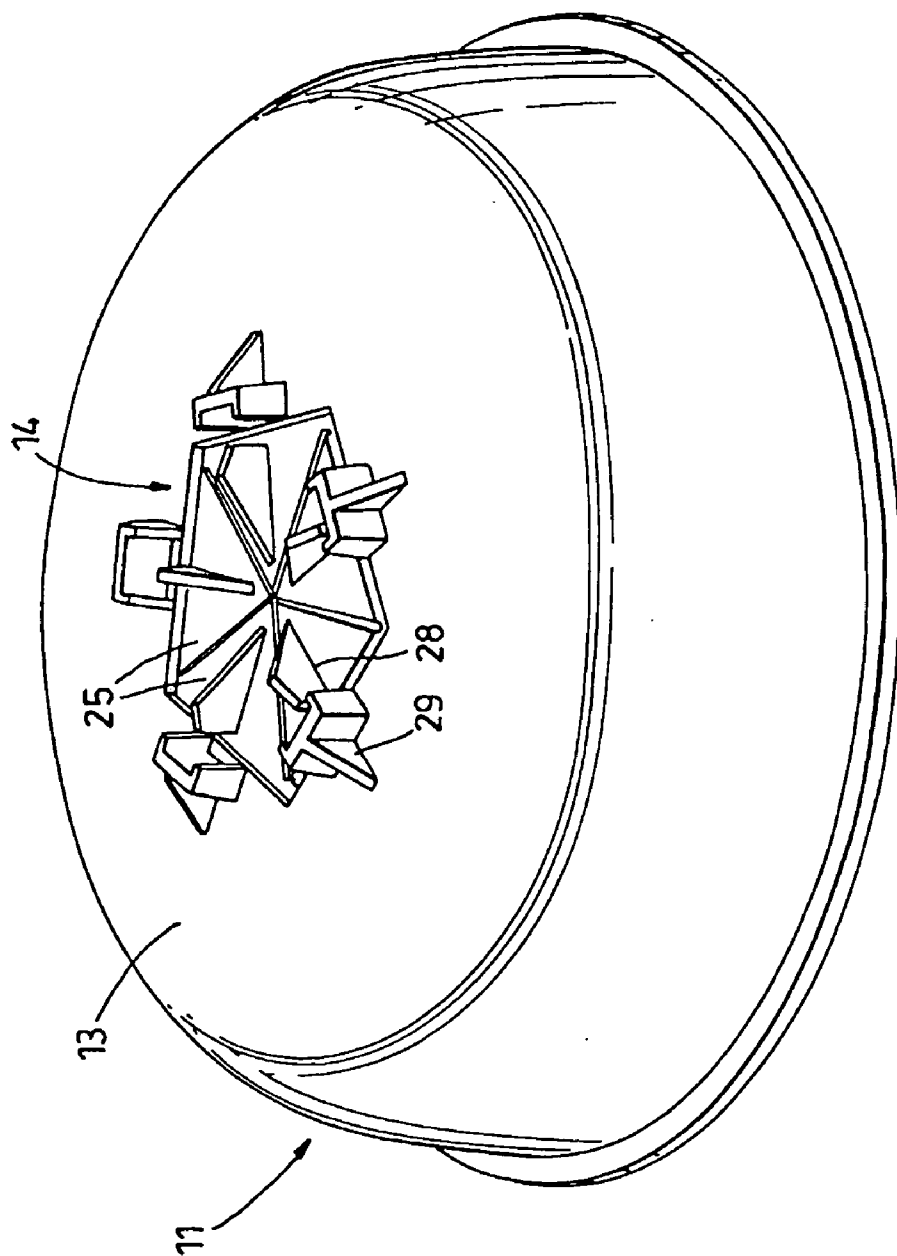


Fig. 15

CONTAINER WITH OUTLET

[0001] This invention relates to containers, particularly for food product, the containers each having an outlet and being arranged so that the internal volume thereof is reduced to extrude product through the outlet.

[0002] There has been proposed in PCT patent specifications WO96/01224 and WO94/13154 containers from which food product, particularly ice cream, is extruded through an outlet whose cross-section is less than the cross-section of the container. In these earlier containers the internal volume of the container is reduced by deforming the container. However, there are other ways of reducing the internal volume, for example by the use of a piston in the container. The containers have had an outlet through which product is discharged and the outlet shapes the product during discharge to enhance the product's appearance.

[0003] To improve the usefulness of the container, there should be straightforward means for opening the outlet whilst providing sufficient security to prevent product from becoming inadvertently discharged.

[0004] According to the invention, there is provided a container which has an outlet and is arranged so that the internal volume of the container is reduced to extrude product through the outlet, the outlet being arranged to shape the product as it is discharged through the outlet, the outlet being defined by portions of the container moveable under pressure of product in the container to be displaced outwardly of the container to define an opening between said displaced portions, the extent of movement of said displaced portion being limited by movement limiting means associated with the displaced portions.

[0005] Preferably, the displaced portions are generally formed as segments of a circle. Between successive segments there may be interconnecting means which is frangible when the pressure of product in the container is applied to said portions. Conveniently, there are between three and six segments whereby to shape the product to a star-shaped cross-section. The portions may be separated by radial lines of weakness extending from a central position of the outlet.

[0006] The outlet may be formed in a region of the container which is concavely shaped so that, as the internal pressure in the container is increased, the concave shape is deformed outwardly assisting in causing the displaced portions to separate from one another.

[0007] In one arrangement, the displaced portions carry projecting means which, following displacement, are arranged to engage with means adjacent said portions whereby to limit the movement of said displaced portions, and control the cross-sectional shape of the extruded product.

[0008] Further features of the invention will appear from the following description of an embodiment of the invention given by way of example only and with reference to the drawings, in which:

[0009] FIG. 1 shows a perspective view of a two-part container suitable for use with the invention, shown separated,

[0010] FIG. 2 shows an underside view, in perspective, of the container of FIG. 1, illustrating the outlet,

[0011] FIG. 3 shows a plan view of the outlet of the container of FIG. 2, when closed,

[0012] FIG. 4 shows a plan view corresponding to FIG. 3 with the outlet open,

[0013] FIG. 5 shows a cross-section on the line A-A in FIG. 4 with the outlet open,

[0014] FIG. 6 is a cross-section corresponding to FIG. 5, with the outlet closed,

[0015] FIG. 7 is a cross-section of an alternative form of outlet in the closed position,

[0016] FIG. 8 is a cross-section corresponding to FIG. 7 with the outlet open,

[0017] FIG. 9 is a further alternative form of outlet in the closed position,

[0018] FIG. 10 is a cross-section of the outlet of FIG. 9 in an open position,

[0019] FIG. 11 is a plan view of an alteration form of outlet in a closed position and

[0020] FIG. 12 is a cross-section on line 12-12 in FIG. 11,

[0021] FIG. 13 is a view corresponding to FIG. 11 in an open position and FIG. 14 is a cross-section along the line 14-14 in FIG. 13, and

[0022] FIG. 14 is a perspective view of the base of the container of FIGS. 3-6.

[0023] Referring to the drawings, there is shown a container which is intended to be used in dispensing apparatus of the kind described in PCT patent specifications WO96/01224 and WO94/13154. In using the container, it is filled with product at a location remote from the dispensing apparatus and is frozen, transported to the apparatus and then dispensed into receptacles by extrusion.

[0024] The illustrated container comprises a base portion 11 and a lid or closure 12. The base 11 is of circular section and has a hemispherical lower part 13 in which is formed an outlet 14 located centrally of the base 11 although, if required, more than one outlet 14 may be provided in the base 11. There is provided a shoulder 15 midway up the base 11, and an outwardly tapering portion 16 terminating at the upper end of the base 11 in a lip 17 defining an inlet 18 into which the product is charged into the base 11. After filling, the closure 12 is located over the lip 17 to make sealing engagement with the base 12. Centrally of the closure 12 is formed a domed portion 20 which extends upwardly and has a flattened region 21 in the central area. In use the food container is discharged by extrusion of product from the outlet 14 by a plunger (not shown) engaging the domed portion 20 and causing it to deform downwards towards the inner surface of the portion 13 of the base 11. The deforming action reduces the internal volume of the container putting the product therein under pressure and causing the product to be discharged through the outlet 14, in known manner.

[0025] The outlet 14 is arranged to be shaped such that product being extruded through the outlet takes up an external shape which is the shape of the outlet 14.

[0026] Referring now particularly to FIGS. 3-6, the outlet 14 of one embodiment is shown in more detail. In this arrangement, the outlet is defined by five segments 25 which

are hinged about their wider end at **25A** and which, when the container is ready for use, are coplanar with the underside of the portion **13** of the container base **11**. The individual segments **25** are formed with radial lines of weakness **26** between successive segments extending radially from a central point **27**. The arrangement is such that upon pressure being applied to product within the container, the segments separate from one another along the lines of weakness **26** and are able to pivot about the hinge lines **25A** thereby opening up a central opening **30** as seen in **FIG. 4**. The hinge lines **25A** are formed to provide a predefined hinge in the moulding process, for example by locally reducing the thickness.

[0027] It will be appreciated that the size and shape of the opening **30** is dependent upon the extent which the segments **25** have moved about their associated hinges **25A**. In order to predetermine such extent of movement, each of the segments **25** is formed with a protrusion or stop member **28**. A complimentary protrusion or stop member **29** is located integrally formed with the base member **13** so as to be in alignment and co-operatively arranged with the stop member **28**. The stop members **28** and **29** have co-operating abutment surfaces **28A** and **29A** so that as the segments **25** are moved about their hinges **25A** during dispensing, the abutment surfaces **28A** and **29A** come into contact with one another and limit further movement of the segments **25** about their hinges **25A**. The stop members **28** and **29** are arranged to be of a size to limit the segment to move a predetermined amount according to the shape of the opening **30** which is required.

[0028] As illustrated, the opening **30** is of a shape to provide a five-pointed star shape but it will be appreciated that if fewer or more than five segments are provided the shape will change, but it is still preferred that the opening **30** is of star-shape. The stop members **28** and **29** are arranged to ensure that the segments **25** move about their associated hinges, a limited extent to provide an opening **30** of the desired shape. It will be appreciated that if the segments **25** were permitted to move to a position at, say, a right angle to the base, the shape of the opening would become that of a pentagon and the product being extruded through the opening **30** would no longer provide a star-shaped cross-section. Customers for ice cream products generally prefer the extruded ice cream to have a star-shaped cross-section. The illustrated arrangement ensures that this is achieved with an outlet arrangement which opens under the pressure of product being discharged.

[0029] Referring now to **FIGS. 7 and 8**, there is shown an alternative outlet arrangement. In this case, a similar arrangement to that of the preceding embodiment is provided except that the segments **25** when closed extend to present a concave surface to the outside of the container. A similar arrangement of stop members **28** and **29** is provided for each segment **25** but in the present embodiment the initial movement of the segments **25** in the outwards direction ensures that the lines of weakness **26** are frangible and are separated from one another during the initial stage of discharge. The segments move towards an outwardly convex shape during such movement.

[0030] Referring now to **FIGS. 9 and 10** there is shown a further arrangement similar to that of **FIGS. 7 and 8** except that in this case each of the segments **25A** is provided with

a stop member **31** which is of such a size and shape that when the segments have moved downwards a predetermined amount, a portion **31A** of the segment comes into contact with the underside of the container base **13** to define the extent of movement of the segment.

[0031] It should be noted that in the drawings the stop members **28**, **29** and **31** are shown on one of the segments **25** only, for illustration purposes.

[0032] Referring to **FIG. 11-14**, there is shown an outlet in a container which is of generally elongate rectangular shape and is intended to have product extruded to it to form a shape which is a zig-zag shape as defined in the shaded area **45** in **FIG. 13**.

[0033] The area within the rectangle of the outlet is, when the outlet is closed, as in **FIGS. 11 and 12**, occupied by pivotable segments **23** each of generally triangular shape and hinged at **46** along the side opposite to apex **47** to be pivotable about the line **46** between the closed position of **FIGS. 11 and 12** and the open position of **FIGS. 13 and 14**.

[0034] The segments **25** along their side edges **48** are frangibly connected to adjacent segments **25** whereby the frangible connections are broken when pressure within the container exceeds a predetermined amount to permit the segments **25** to pivot out along the hinged lines **46**.

[0035] Alternatively, the segments **25** are in sealing contact with the side edges **48** of adjacent segments, but not connected thereto so that internal pressure of product towards the segments to pivot causes the pivoting movement of the segments.

[0036] The frangible connections can be by providing a line of weakness along the side edges **48**, perforations, a line of thinner material, or the material may be cut through along such lines.

[0037] Each of the segments is provided on its outer surface with a stop member **28** which may be in the form of a narrow protrusion shaped over its outer edge **49** to engage with an abutment **29** which is formed to extend around the outlet **14** either on a support for the container during operation and extrusion, or on the container base itself.

[0038] The abutment **29** is shown as presenting a surface **50** extending at a right-angle to the base of the container to be engaged by the edge surface **49** of each segment whereby to limit the pivotal movement of each segment and to leave the segments in the positions shown in **FIGS. 13 and 14**, thereby providing the outlet shape **45** as described.

[0039] It will be appreciated that other means may be provided for controlling the movement of the segments **25** about their associated hinges **25A**. For example, the segments **25** may have a different thickness over their radially inner and the outer portions, so as to be more flexible over the radially inner portion. This enables the segments **25** to flex to provide an opening of a similar shape to the opening **40** in **FIG. 4**. In this arrangement, the hinge **25A** may be omitted.

[0040] The illustrated arrangement normally avoids the need to apply a peelable closure over the outlet **14** which can have safety problems particularly when dispensing from containers in a self vending arrangement. Moreover, product should not be able to pass through the container along the

lines of weakness **26** during filling the container, transportation and storage of the container. The segments **25** may be separated from one another along said radial lines before internal pressure is applied without the risk of leakage since the product within the container is frozen and the segments are in contact with each other and thereby provide a seal.

[0041] In use of the container described, it is placed in the apparatus. Internal pressure is applied to the product within the container so that the segments are separated from one another along the lines of weakness **26**, the segments move downwards about their hinge line **25A** and product is discharged to be shaped according to the shape of the opening **30**.

[0042] The container may be used to deliver more than one portion of product. Thus after delivery of one portion the outlet-segements are closed up to seal or close the outlet due to the resilience of the hinge connection.

1. A container having an outlet and being arranged so that the internal volume of the container is reduced to extrude product through the outlet, the outlet being arranged to shape the produce as it is discharged through the outlet, the outlet being defined by portions of the container being moveable under pressure of product in the container to be displaced outwardly of the container to define an opening between said displaced portions, the extent of movement of said portions being limited by movement limiting means associated with displaced portions.

2. A container according to claim 1 wherein the displaced portions are formed as segments of a circle.

3. A container according to claim 2 wherein successive segments are interconnected prior to displacement by interconnection means which is frangible when pressure of product in the container is applied to said portions.

4. A container according to claim 1 wherein there are between three and six of said displaceable portions whereby product issuing through the opening is shaped through a generally star-shaped cross-section.

5. A container according to claim 1 wherein the displaceable portions are separated from one another whereby radial

lines of weakness extending from a central position of the outlet.

6. A container according to claim 1 wherein the outlet is formed in a region of the container which is concavely shaped so that as the internal pressure in the container is increased, the concave is deformed outwardly.

7. A container according to claim 1 wherein said displaceable portions carry projecting means which during displacement are arranged to engage with means adjacent said portions whereby to limit the movement of said displaced portions.

8. A container according to claim 7 wherein said limiting means lie generally radially in relation to the central part of the outlet and each displaceable portion has an outwardly directed part which engages with an upstanding abutment adjacent the outlet when fully displaced.

9. A container according to claim 8 wherein the inter-engaging surfaces on the projecting means and the abutments are inclined to one another before displacement to achieve the desired displacement before inter-engagement of said surfaces.

10. A container according to claim 6 wherein the outlet is of elongate shape having displaceable portions in two groups, the portions in one group extending along one side of the opening and the portions in the other group extending along the other side of the opening.

11. A container according to claim 10 wherein the outlet is on generally rectangular shape, the portions extending along each of the longer sides of the rectangle.

12. A container according to claim 10 wherein the displaceable portions are integral with the container and move out of the plane of the outlet by a hinging movement about one side.

13. A container according to claim 12 wherein the portions are each hinged to the container about a hinge line.

14. A container according to claim 12 wherein the positions are adjacent to but separate from adjacent portions.

* * * * *