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 **Nestable container with lid.**

 Nestable container with lid. The skirt of the lid rests with its flange (19) on a flange (8) of the container. Flange (8) carries an auxiliary wall (10). At the junction between flange (8) on the auxiliary wall (10) recesses are provided for lifting the lid. Between the wall (4) and the auxiliary wall (10) plates (11) are provided.

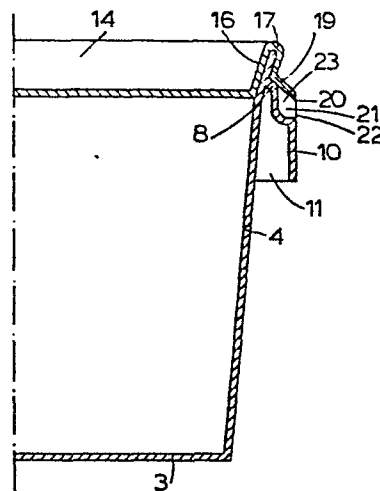


FIG. 3

NESTABLE CONTAINER WITH LID

The invention relates to a nestable container with lid, both made of plastic, the lid of which comprises a central portion and, on the circumference thereof, a skirt with flange turned down over the edge of the container, in which assembly inward skirt portions may
5 engage under outward container portions to hold the lid onto the container, the angle of inclination between the container wall and the vertical differs in the upper reaches from that in the lower reaches, and the wall of the container is provided all around with a container flange with a descending auxiliary wall to which optionally a bail can
0 be fastened.

Such a container with lid is known from the U.S. patent specification 4,165,020.

Containers of this type have been made millionfold for decades by injection moulding and have been used as disposable packing
5 material for a variety of substances, such as foodstuffs and paints.

In course of time the standards of attainment imposed upon these containers have strongly increased in number, continued prominence having been given, however, to leakproofness and a low price. Major factors determining the cost are the materials and production
0 costs. As far as the latter costs are concerned, a reduction of the time of the injection moulding cycle constitutes a saving.

In order to reduce the cooling period during this cycle it is important for the wall thickness of the container to be kept the same everywhere as far as possible, because the length of this period is
5 determined by the portion having the greatest wall thickness. In order to shorten the cooling period, but also to reduce the consumption of materials, a further aim is, with due observance of the strength requirements, to reduce the wall thickness.

A disadvantage of the known container is that the top edge is in the form of a thick bead resulting, as said above, in an extension of the cooling period. The known container further has a slit between the flange of the lid and the flange of the container. This constitutes a disadvantage in the transport of such containers when, standing side by side, they are liable to shocks and impacts. The fact is that the presence, at the same level, of gripping edges formed by such narrow openings and flanges results in adjacent containers climbing onto each other during the transport. This problem is known, for instance, from the United States patent specification 3,804,289. Yet another disadvantage of the known container is formed by the presence of extensions projecting below the auxiliary wall, which extensions are usually sharp and may cause injuries. Moreover, these projections are apt to get stuck behind other objects, for instance clothes. These two extensions, which serve as nesting stops, are as such a disadvantage, because they are apt to damage the top edges of containers, particularly in high stacks of nested containers that are put down roughly. Notches will then be formed in the top edge of the container, which will afterwards have a very adverse effect on the sealing action of these edges on the lid. Again during the transport these extensions will slowly grind into the top edges in consequence of the relative movement of the containers during the transport. A serious disadvantage of the known container for every user who wants to remove the lid from the container is that the container can be opened only by using a tool that must be inserted into the slit between the skirt of the lid and the flange of the container in order to be able to raise the lid by levering.

The object of the invention is to provide a nestable container with lid that does not have the said disadvantages, or to a far smaller degree.

This has been achieved in that near its top edge the wall of the container passes, via a sharp bend, into a lip at the mouth of the container, which lip has an angle of inclination in respect of the vertical larger than the rest of the container wall, in that the container flange with the descending auxiliary wall is positioned between

the sharp bend in the wall and the top edge of the container, in that radial plates have been provided all around the container between the wall of the container and the auxiliary wall, the bottom ends of which plates serve as nesting stops in the nesting of the containers, in that one or more recesses have been made at the junction between the flange of the container and the auxiliary wall, which recesses have mouths both on top of the container flange and on the outside of the auxiliary wall, in that the skirt of the lid forms a sharp angle in respect of the central portion of the lid and is so provided at its free end with an outwardly flared flange that, when the container is closed, the inside of the skirt is in sealing contact with the outer wall of the container above the container flange, in that the flange of the lid lies on the flange of the container and covers the recesses at least in part and in that the circumference of the auxiliary wall constitutes the greatest circumference of the container-lid assembly.

The wall thickness of such a container with lid may be the same everywhere. The fastening of the lid is achieved by the widened lip at the mouth of the container together with the position of the skirt of the lid. The seal is at least effected by the wall of the skirt being seated against the outer wall of the container and the lid against the top edge of the container. The required rigidity of the portion of the container wall forming part of the seal is obtained by the presence of a great many radial plates extending downwards from the flange of the container. The radial plates further have the function of nesting stops. Together with the auxiliary wall surrounding them they form a very strong ring round the container in its upper reaches. This has the advantage, in the first place, that in these parts it is difficult for the container to be depressed so that leaks are precluded and, secondly, that when lifting a filled container without lid by its bail, the deformation of the container wall is avoided to a considerable degree. As a result of the large number of radial plates serving as nesting stops, the sensitive top edges of the nested containers lying against these plates are no longer liable to the notching effect of two or just a few nesting stops. Indeed, owing to the large number of plates, in the range of for instance 25-75, a

pressure distribution is achieved over an equally large number of places on the top edge of a container underneath. The plates can be attached to the wall of the container or to the auxiliary wall or to both of these walls. Preferably the plates are attached to the auxiliary wall because this prevents stress-corrosion at the innerside of the container. As these plates are surrounded by the auxiliary wall, they do not form disturbing projections. This smooth auxiliary wall surrounding the radial plates round the container provides excellent protection against the climbing of containers placed against each other as described above. Neither is this effect eliminated, as with the known container, by a slit between the flange of the lid and the flange of the container, because these flanges are seated one on the other without any play. The height (h) from the bottom ends of the plates to the top edge of the container can be influenced by the thickness (d) of the container wall, the distance between the walls of the nested containers, the so-called nesting play (s), and the angle (α) contained by the container wall and the vertical. The relative relationship can be represented by the formula:

$$h = \frac{d + s}{\sin \alpha}$$

The recess at the junction between auxiliary wall and container makes it very easy for the lid to be removed by hand and constitutes as such a logical indication for opening. It is therefore not necessary to provide the container with arrows and directions for use. The recess is further meant to be a stop catch in the printing of containers, which will rotate in the process and be stopped after each rotation by a projection slipping into the recess. Another advantage of the auxiliary wall is that it may be used as rubbing surface for a flat plastic bail tightly fastened against the auxiliary wall, the shape of which bail corresponds between its two ends with the shape of the circumference of the auxiliary wall. Thus a bail is formed that can be held firmly in, for instance, horizontal position, which is an advantage in the filling, printing and closure as described also in the disclosed Netherlands patent application 174819.

The flange of the container and the flange of the lid are preferably sloping down in order that any substances spilt onto the flange of the container during the filling may run down from the container flange and will consequently not make it impossible for the
5 flanges of the container and the lid to be seated against each other.

Preferably, the flange of the lid makes a larger angle with the horizontal than the flange of the container. In that case only the outer circumference of the flange of the lid contacts the flange of the container. This has the advantage that, during closing, posi-
10 tioning of the lid on the container is easier.

The height of the auxiliary wall is preferably more than 1.0 cm to provide enough room for the mouth of the recess on the auxiliary wall provided for the insertion of the finger tips and to avoid the climbing of containers placed side by side. By making a correct choice
15 of the said angle of inclination (α), the wall thickness (d) and the nesting play (s) it is possible to obtain the space required for the desired height of the auxiliary wall.

It is to be recommended to produce the lid from a synthetic material more flexible than the synthetic material of the container.
20 Thus a better contact can be obtained between the skirt of the lid and the stiffened wall of the container and the application of the lid, which requires the skirt to move outwards slightly, is facilitated.

In order to obtain yet a third sealing surface, the lid can be provided with a central portion recessed into the container with a
25 sealing fit against the inner wall of the container, which central portion is connected with the skirt by an annular lid portion. The strongly widened top edge is then at least in part received in a channel in the lid shaped like an inverted U. The recessed central portion may reach beyond the position of the container flange on the
30 container. Thus the sealing surface is increased and in applying the lid the centring is improved.

The invention will be further elucidated with reference to an embodiment shown in the drawing.

In the drawing

- fig. 1 is half an axial section of a container with a lid separated therefrom and half a side-elevational view of a container with a lid applied on top according to the invention;
- fig. 2 is a bottom view of the container of fig. 1;
- 5 fig. 3 is an axial section along line III-III in fig. 1, and
- fig. 4 shows an axial section of a variant of the container according to the invention.

In fig. 1 a round nestable container is indicated by 1 and a lid going with it by 2.

10 The container has a bottom 3 and a wall 4 at a suitable nesting angle, which wall terminates via a sharp bend 5 and a widened lip 6 at the container mouth in a top edge 7. Between top edge 7 and the sharp bend 5 in the wall, a flange 8 slants down around the container, provided at its free end 9 with a descending auxiliary wall

15 10. Between the auxiliary wall 10 and the container wall 4 there are a great many, for instance 72, radial plates 11 indicated with dotted lines, one of which is situated just behind the plane of the drawing. The plates extend from the flange of the container to bottom 12 of the auxiliary wall and the bottom ends 13 of these plates jointly serve as

20 nesting stop for a container underneath.

Lid 2 consists of a recessed central portion 14 comprising a lid panel 15 and an inner skirt 16, which central portion is connected, via an annular lid portion 17, with a skirt 18 inclined inwards. Skirt 18 is provided with a flared flange 19 the outside

25 diameter of which does not exceed the outside diameter of auxiliary wall 10.

In Figures 1 and 3 a recess 21 has been drawn at junction 20 between flange 8 of the container and the auxiliary wall 10, which recess has a mouth 22 on the outside of auxiliary wall 10 and a mouth

30 23 on top of flange 8 of the container. In Fig. 1 mouth 23 has been indicated with a dotted line, because in this case it is completely covered by flange 19 of the lid.

In the right-hand section of Fig. 1 a flat bail 24 is shown, tightly secured between two plates to auxiliary wall 10 with, for

35 instance, a press button 25 while capable of being turned. The other

end of the bail is fastened to the auxiliary wall at a place, see fig. 2, situated diametrically opposite the first point 25 on the auxiliary wall. Bail 24 consists of a flexible plastic material and in horizontal position it just fits round the outside of the auxiliary wall.

5 It has been found that a container with lid has the advantage of being capable to cope with a great vertical downward force onto the lid without the lid tending to sink into the container. This is probably attributable to the fact that, with the lid being subjected to such a load, the inwardly inclined skirt of the lid is
10 less inclined to assume a horizontal position, although the specially reinforced lip of the mouth may also play a part here. The fact is that, if the portion of the lip of the container mouth above the flange of the container is subjected to a force directed inwards, plates 11 prevent the portion of the lip of the container mouth below the
15 flange of the container from being bent outwards so that otherwise, at a certain force, the portion above the container flange would have a greater freedom of movement, making it easier for the skirt of the lid to be pulled over edge 7. All this makes it possible for filled containers with lids to be stacked high.

20 From the point of view of moulding technique the advantage of the design is that the mould need not comprise more than two parts capable of moving along a straight line in respect of each other for opening and closing the mould. Moreover, from the point of view of moulding technique the design also has the advantage that the projec-
25 tions for making the recesses can be taken away by a simple operation. The advantage is that, if so desired, a container-lid assembly can thus be produced the lid of which is indeed very hard to remove. This requirement is sometimes imposed by industrial users of packaging containers to prevent unauthorized people from gaining access to the
30 (hazardous or very expensive) packed goods during the transport.

The container with lid according to the invention need not necessarily have a round horizontal cross section, but may also have other cross sections, such as an elliptic or square cross sections.

The container may be produced from a plastic material different from that of the lid. For instance, the container from polypro-
35

pylene or high-density polyethylene and the lid from soft low-density polyethylene.

The container may vary in height, for instance it may be a low pot or a slightly higher pail. In both cases the container has a printing or labelling surface all around its wall not interrupted by lugs and/or nesting ribs.

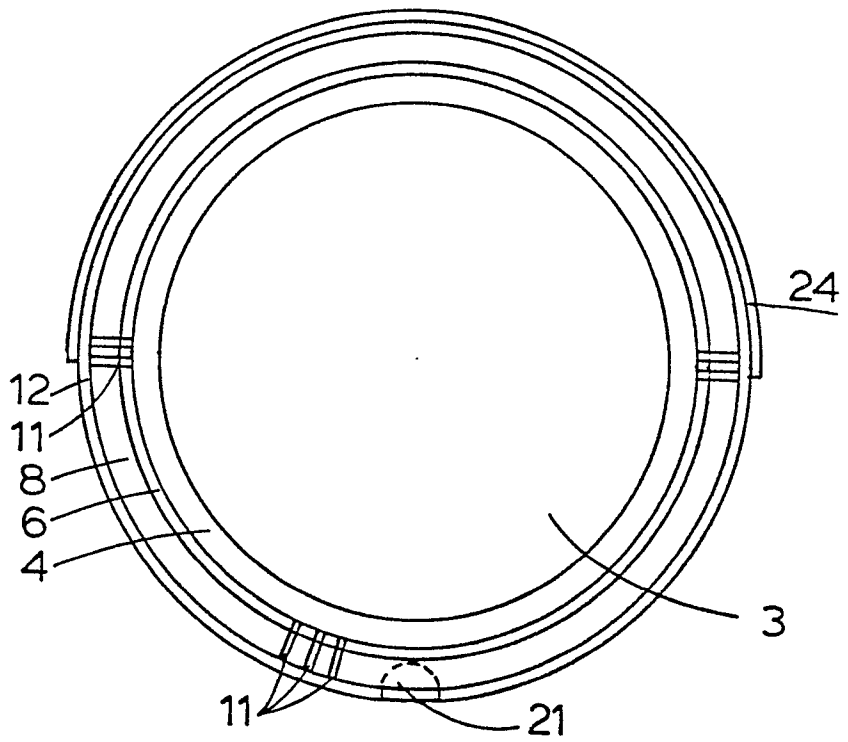
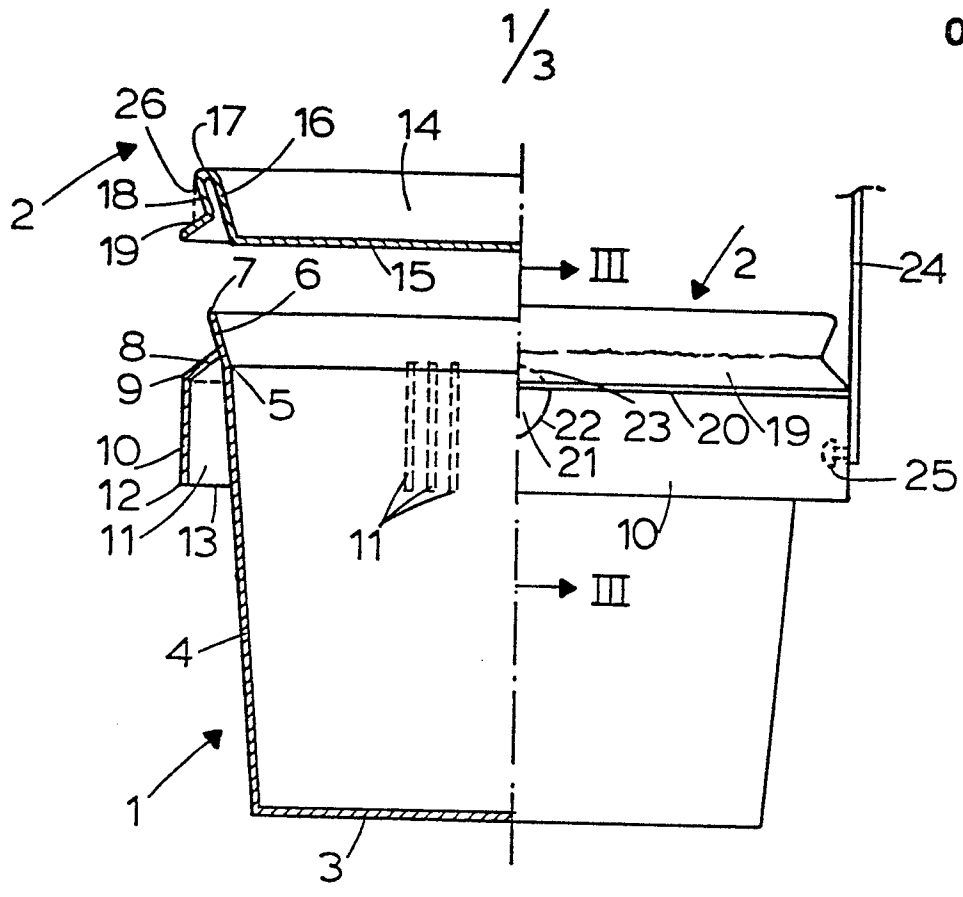
In order to provide better protection against opening of the lid by the contents, for instance in a fall of a filled container, the wall thickness of the lid between the skirt and the flange of the lid may optionally be greater. This is shown diagrammatically in fig. 1 by the dotted line 26.

Fig. 4 shows a variant of the container. The top edge 7 of lip 6 possesses a vertical mouth wall 27 which fits closely into the corresponding groove 28 in the lid. The angle between flange 19 and the horizontal plane H is larger than the angle between flange 8 and plane H. Fig. 4 shows the plate 11 being free from the container wall 4. In practice, after the cooling of the injection-moulded container, the plates 11 may be in close contact with the container wall without being attached to this wall 4.

CLAIMS

1. Nestable container (1) with lid (2), both made of plastic, the lid of which comprises a central portion (14) and, on the circumference thereof, a skirt (18) with flange (19) turned down over the edge (7) of the container, in which assembly inward skirt portions may engage under outward container portions to hold the lid onto the container, the angle of inclination between the container wall and the vertical differs in the upper reaches from that in the lower reaches, and the wall (4) of the container is provided all around with a container flange (8) with a descending auxiliary wall (10) to which optionally a bail (24) can be fastened, the container with lid being characterized in that near its top edge the wall of the container passes, via a sharp bend (5), into a lip (6) at the mouth of the container, which lip has an angle of inclination in respect of the vertical larger than the rest of the container wall (4), in that the container flange (8) with the descending auxiliary wall (10) is positioned between the sharp bend (5) in the wall and the top edge (7) of the container, in that radial plates (11) have been provided all around the container between the wall (4) of the container and the auxiliary wall (10), the bottom ends (13) of which plates serve as nesting stops in the nesting of the containers, in that one or more recesses (21) have been made at the junction (9) between the flange (8) of the container and the auxiliary wall (10), which recesses have mouths both on top of the container flange and on the outside of the auxiliary wall, in that the skirt (18) of the lid (2) forms a sharp angle in respect of the central portion of the lid and is so provided at its free end with an outwardly flared flange (19) that, when the container is closed, the inside of the skirt is in sealing contact with the outer wall of the container above the container flange (8), in that the flange (19) of the lid lies on the flange (8) of the container and covers the recesses (21) at least in part and in that the circumference of the auxiliary wall constitutes the greatest circumference of the container-lid assembly.

2. Container with lid according to claim 1, characterized in that the flange (8) of the container and the flange (19) of the lid are inclined downwards.
3. Container with lid according to claim 1 or 2, characterized in that the auxiliary wall (10) is at least 1.0 cm high.
4. Container with lid according to claim 1, characterized in that the lid (2) is made of a synthetic material more flexible than the synthetic material of the container (0).
5. Container with lid according to any one of claims 1-4, characterized in that the lid (2) has a recessed central portion (14) providing a sealing fit against the inner walls of the container, which central portion is connected via an annular portion (17) of the lid with the skirt (18).
6. Container with lid according to any one of claims 1-5, characterized in that the wall of the container is equally thick everywhere.
7. Container with lid according to any one of claims 1-6, characterized in that the container is provided with a flat plastic bail (24) tightly secured with its ends against the auxiliary wall, the shape of which bail corresponds between its ends with the shape of half an outer circumference of the auxiliary wall (10).
8. Container with lid according to any one of claims 1-7, characterized in that the plates (11) between the wall (4) of the container and the auxiliary wall 10 are only attached to one of these walls preferably to the auxiliary wall (4, 10).
9. Container with lid according to any one of claims 1-8, characterized in that the top edge 7 is provided with a vertical mouth wall which can fit into a corresponding vertical groove in the lid.
10. Container with lid according to any one of claims 1-9, characterized in that the angle between the flange (19) of the lid and a horizontal plane (H) is larger than the angle between the flange (8) of the container and the horizontal plane (H).



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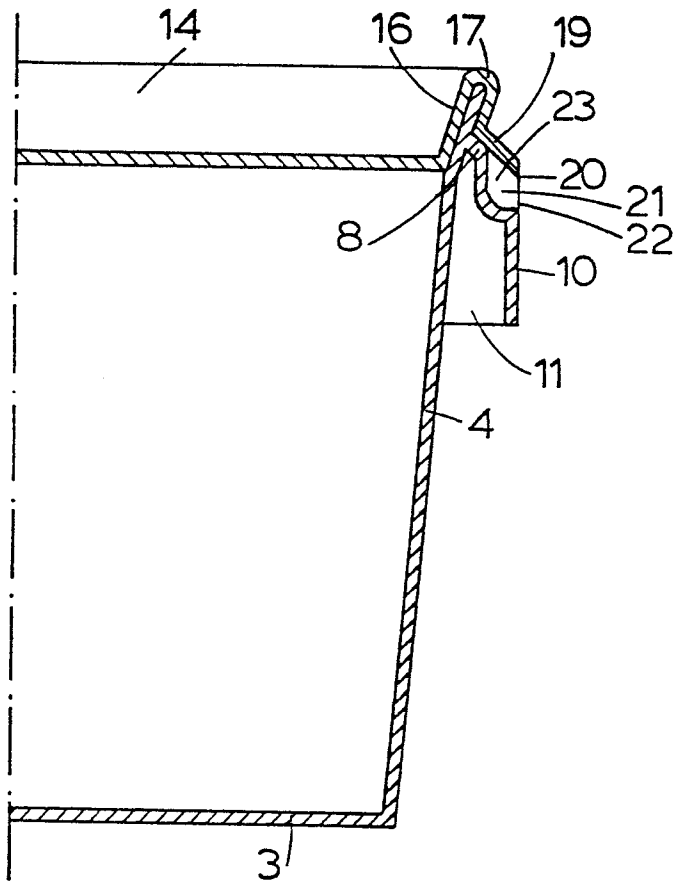


FIG.3

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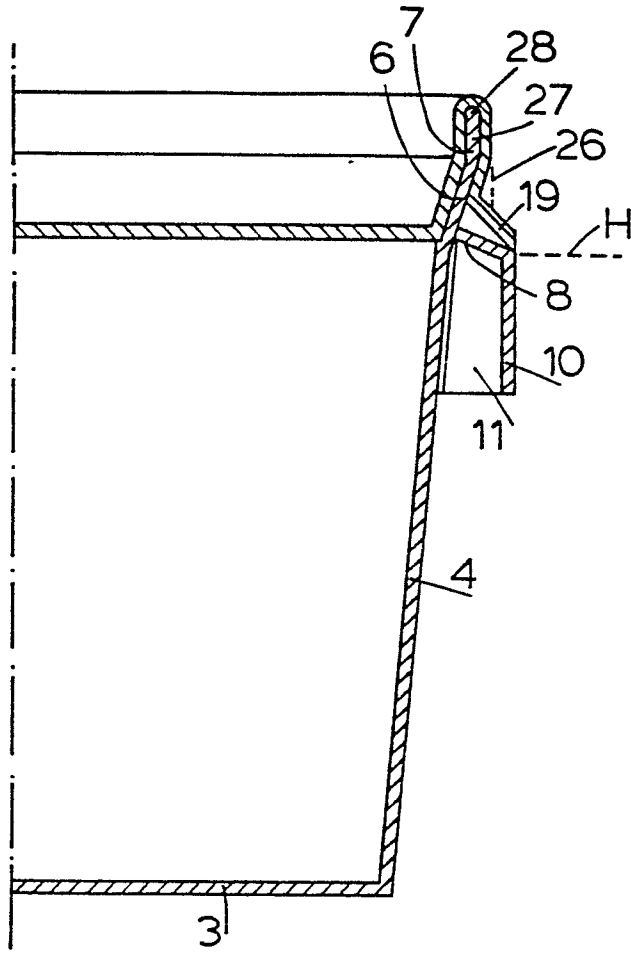


FIG. 4



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
A	US-A-2 789 608 (TUPPER) * Column 2, line 57 - column 4, line 13; figures 1-9 *	1,2,5,6	B 65 D 43/06
A	GB-A-1 215 856 (DART) * Page 2, lines 18-43; figures 1-7 *	1,2,5,6	
D,A	US-A-4 165 020 (HOSELTON)		
D,A	FR-A-2 176 796 (VULCAN PLASTICS) & US - A - 3 804 289		
A	NL-A-6 513 804 (REXALL DRUG) & GB - A - 1 128 292		TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
			B 65 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 04-03-1986	Examiner VANTOMME M.A.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			