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54 **Fitted up vessel for the prompt preparation of diluted detergents by starting from concentrated detergent single-dose containers.**

57 The concentrated detergent is contained into single-dose containers (8) in the form of pots sealed by an easily tearable sheet material (11). The fitted up vessel is provided at its neck portion with a piercing element (4) in the form of a pyramidal truss-like element. The user inserts the said single dose containers (8) on the said piercing element (4), thus tearing the thin closure sheet material. The concentrated detergent flows into the lower body portion (1) of the vessel wherein the diluting liquid (water) has already been introduced.

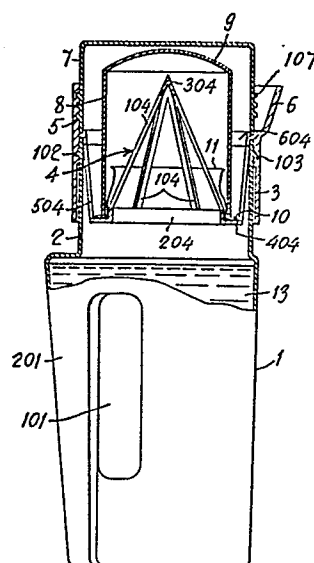


Fig. 2

Fitted up vessel for the prompt preparation of
diluted liquid detergents, by starting from
concentrated detergent single-dose containers.

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This invention relates to the liquid detergents for
dish-washing, and more particularly to a fitted up vessel
for the extemporaneous preparation of diluted liquid
10 detergents at the dilution of use, by starting from
concentrated detergent packages.

The liquid detergents for domestic use presently on the
market are marketed in bottles of plastics, as a diluted
15 product ready to be used.

This marketing system has several drawbacks, some of
which are:

- a) Expensive package;
- 20 b) Expensive transport, as generally the diluting

water is over 80% of the transported load;

c) Waste of material, as the bottle is used only once, and resulting greater pollution.

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U.S. Patent No. 3,968,820 describes a mixing container for dissolving corrosive or poisonous chemicals, supplied in a sealed package, in a solvent. The container comprises a filling neck, which can be closed by a lid, for the chemicals, more particularly for the production of a plant protective spraying liquid, characterized by the following features. The filling neck is provided with a sleeve extension, directed towards the interior of the container, for receiving an as yet unopened chemical capsule. The sleeve extension in the interior part has cutting knife, the cutting edge of which extends completely across said extension, so that upon said capsule being pressed by means of a pressing punch insertable into said neck against said knife edge, said knife slices completely through said capsule in a manner that said capsule can pass said knife and move into said vessel.

25 The above prior art device is rather complicated. Moreover, the fact that the sliced capsule is caused to move into the vessel is very objectionable.

30 It is therefore the object of this invention to overcome the inconveniences of the known systems

for preparing and marketing liquid detergents for domestic use.

5 According to a feature of this invention, this
object is attained by packaging a concentrated detergent
into single-dose containers being suitable for
preparing a pre-established volume of final product,
and by supplying the user with a vessel for the diluting
10 liquid, provided with a device for opening easily
said single-dose containers and for pouring their
contents into the diluting liquid previously poured
into said vessel, whilst preventing said emptied
containers from dropping into the said vessel.

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Generally, the said diluting liquid is water from a city water supply system.

20

Advantageously, said single-dose containers are
in form of pots made of a plastics foil, or of plastics-
-coated paper, or of any other suitable material, and
are sealed by an easily tearable sheet material, such
25 as an aluminum foil.

25

According to one preferred embodiment of this invention,
30 the said vessel is in the form of a cylindrical bottle, and

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said device for opening and emptying the said single-dose containers is accomodated within the top portion or neck of the bottle.

5 The fitted up vessel according to the invention is advantageously provided with a screw plug, and by a partial rotation thereof a port setting into communication the interior of the vessel with a pouring spout provided thereon, will be opened or closed.

10

 Further features and advantages of this invention will be more clearly apparent in the course of the following
15 detailed description of one preferred embodiment thereof, which is made with reference to the accompanying drawings, wherein:

 Figure 1 is an elevational view showing a fitted up
20 vessel according to the invention;

 Figure 2 is a partly sectioned side elevational view of the vessel shown in Figure 1;

25 Figure 3 is an exploded view of the vessel shown in Figures 1 and 2; and

 Figure 4 is an elevational view, in an enlarged scale, showing a concentrated detergent single-dose container,
30 to be used in combination with the vessel shown in

Figures 1 to 3.

5 Referring to the drawings, and referring particularly
to Figure 3 of same, the fitted up vessel of the invention
essentially consist of a body 1 with a neck portion 2 on
which there is forcibly snap-fitted a ring nut 3
carrying therewithin a piercing element 4, and which is
10 provided with an internally screw-threaded opening 5 and
a pouring spout 6, and with a screw plug 7 that is
susceptible of being threadedly engaged with the screw
threads in opening 5.

15 The body 1 is substantially cylindrically shaped, and
has two built-in wide lateral recesses 101 oriented
according to the directrices of the cylindrical body 1,
and cooperating with each other and with a piece 201
slightly jutting out of body 1, so as to form a handle
20 for gripping the vessel.

 Placed over the body 1 is a cylindrical neck portion 2
which next to its top end is encircled by an outwardly
projecting rib 102 having in cross-section a saw-tooth
25 profile. That portion of neck 2 which lies under the rib
102 is provided with a series of close grooves 202 cut
according to the directrices of the cylindrical neck 2, and
extending downward over a height corresponding approximately
to 2/3 of the neck 2, whereby a so-called knurled coupling
30 is thus formed.

5 The cylindrical ring nut 3 has an annular groove 103 cut in the median area of its inner skirt, and the profile of said groove is complementary to the profile of the rib 102 on neck 2 of the vessel body 1. The inner skirt of ring nut 3 is provided in the region lying under the annular groove 103 with a series of close grooves 203 cut according to the directrices of the ring nut 3 cylindrical skirt, and constituting the complementary member of the knurled coupling 202 in the vessel neck 2.

10 At its upper section, the ring nut 3 is provided on its inner skirt with a quick pitch multi-start screw thread 5, and also with a pouring spout 6, located in correspondence of said screw-threaded zone.

15 Accommodated and supported within the ring nut 3 is a piercing element generally designated by numeral 4, which comprises a pyramidal truss-like structure consisting of a set of small rods 104 that start from a base ring 204 being flush with the bottom plane of ring nut 3, and
20 extend as far as the apex 304 lying substantially at the same level as the top plane of ring nut 3, and is co-axial thereto. The base ring 204 has a sensibly smaller diameter than the inside diameter of ring nut 3, and is provided at its bottom with an annular flange 404. The outside
25 diameter of flange 404 is appreciably smaller than the inside diameter of ring nut 3, so that it is possible to snugly fit the ring nut 3 on the vessel 1 neck 202 provided with the rib 102. Starting from the periphery of the annular flange 404 is a set of strips 504 that extend in the
30 upward direction at the interior of ring nut 3, with a

slight outward inclination toward the inner skirt of ring nut 3, as far as a holding ring 604 situated at a level directly over the groove 103. Through an annular flange 704, the ring 604 is connected to the inner skirt of ring nut 3.

The disclosed vessel is completed with a plug 7 having a cylindrical body provided with an outer screw thread 107 which is adapted for being engaged with the screw thread 5 on the mouth portion of ring nut 3, and with a knurled top end portion 207.

Having so described the fitted up vessel of the invention, the concentrated detergent single-dose container will be now disclosed by referring to Figure 4 of the drawings.

Referring particularly to Figure 4, there is shown a single-dose container which comprises a cylindrical body 8 having its one end closed by a convex end cap 9, and its other end provided with a radially outwardly projecting annular flange 10. A suitable sheet of an easily tearable material 11, such as an aluminum foil, is stretched on flange 10, and is secured thereto such as, for example, by heat welding or by glueing. Such a sheet material forms the tearable closure of the single-dose container 8.

The single-dose container 8 is made from a plastics foil. The inside diameter of container 8 is slightly

greater than the outside diameter of the base ring 204 of the piercing element 4, and the flange 10 is so sized that it can rest on the flange 404 of the piercing element 4, as will be more clearly described hereinafter, the
5 height of container 8 being slightly greater than the height of the piercing element 4, so that the container 8 can be accommodated in the ring nut 3 hollow space which at its bottom is bounded by the flange 404, and at its top is bounded by the bottom of plug 7, any time this plug is fully
10 screwed down on the ring nut 3. The disclosed fitted up vessel is preferably made of plastics, more particularly, the body 1 is preferably made of transparent plastics, while the ring nut 3 and the plug 7 are preferably made of opaque or dulled plastics.

15

Referring particularly to Figure 2 of the drawings, we will now describe how the elements forming the fitted up vessel of the invention are to be assembled, and how this vessel should be used.

20

To mount the ring nut 3 onto the body 1, this ring nut is forcibly fitted on the neck 2 as far as to have its rib 102 snappingly inserted into the annular groove 103 in ring nut 3. During the step of mounting the ring
25 nut 3 onto the body 1, care should be taken that the spout 6 be oriented in the direction diametrically opposite to the direction in which extends the handle portion 201, as shown in Figures 1 to 3. Thanks to the provision of the knurled coupling 202-203, any relative rotation of the
30 ring nut 3 and the neck 2 of the vessel body 1 is prevented,

whereby the required orientation of spout 6 will be maintained.

At this point, the fitted up vessel is ready to be used.

In use, the vessel 1 will be filled with water up to a suitable level marking 12 made on the vessel body 1, and a single-dose container 8 will be then introduced into the hollow space in ring nut 3, with the closure sheet 11 of container 8 being caused to rest on the apex of the piercing element 4, and this container 8 will be pressed downward as far as to have its flange 10 bearing against the piercing element flange 404 (position shown in Figure 2). In the course of this operation, the piercing element 4 will tear apart the closure sheet 11, and the concentrated detergent contained in the single-dose container 8 will then flow down entirely into the underlying vessel 1 and will be dissolved in the water contained therewithin, thus giving rise to the solution of detergent 13 ready to be used. At this point, the plug 7 will be fully screwed down on the top portion of ring nut 3. With the plug 7 fully screwed down, as shown in Figure 2, the fitted up vessel is closed, and its contents cannot be poured out for being used. To pour out the liquid detergent 13, it is sufficient to partly unscrew the plug 7, so as to open a port setting into communication the pouring spout 6 with the hollow in the fitted up vessel. Once all of the liquid 13 has been used, the plug 7 will be unscrewed, the exhausted single-dose

container 8 will be removed, and the body 1 will be again filled with water up to the level marking 12, whereupon a new container 8 will be introduced and pressed against the piercing element 4, thus producing again a fresh dose of liquid detergent 13 ready to be used.

Of course, the described and shown embodiment is only a preferred construction of the invention, it being understood that the advantages of this invention may spread to any models affording like benefits and using the same novel conception.

Therefore, instead of consisting of a truss-like structure, the piercing element 4 may, for example, be in form of one or more intersecting triangular blades, or of a compounded structure. Similarly, the way of fixing and holding up the piercing element 4 onto the ring nut 3 may be altered.

Moreover, also the way of attaching the ring nut 3 to the neck 2 may be changed and, for example, provisions may be made for fixing the ring nut 3 to the neck 2 by glueing, instead of resorting to the type of engagement by the snap-fitting means 102-103, and to the type of connection by the knurled coupling 202-203.

Of course, although in the foregoing specification reference has been made mainly to detergents, it should be understood that the fitted up vessel of the invention can be used with other products, such as auxiliary products for washing purposes, or the like.

CLAIMS

1. A fitted up vessel for the extemporaneous preparation of diluted liquid detergents by starting from a concentrated liquid detergent dose, comprising a vessel (1) for containing the liquid for dilution of the said concentrated detergent; a device (4) for opening and emptying a concentrated liquid detergent container (8) being inserted in the opening of said vessel (1), characterized by the fact that the said device (4) is adapted for holding up the concentrated liquid detergent container (8) so as to prevent it from dropping down into the underlying diluting liquid vessel (1), while allowing the concentrated liquid detergent to freely flow into the vessel (1) containing the diluting liquid, and permitting the thus-formed diluted liquid detergent to be delivered out of said vessel (1); and a plug (7) for stopping the opening of said vessel (1), the rotation of said plug bringing about the closing, respectively the opening, of a port for delivering the diluted liquid detergent out of the said vessel (1), through a pouring spout (6) provided at the opening of said vessel (1).

2. A fitted up vessel according to Claim 1, characterized in that the said device (4) for opening and emptying a concentrated liquid detergent container (8) comprises a pointed element which at its base is fixed to the bottom of an apertured crate-like element being fitted within, and being fastened to the mouth portion of vessel (1).

3. A fitted up vessel according to Claim 2,
characterized in that the said pointed element is in form
of a pyramidal truss-like element which consists of a set
of small rods (104) being fastened by their one end to an
5 annular base element (204) and being set in a convergent
relation so as to merge at their opposite other end into a
common sharp apex (304).

4. A fitted up vessel according to Claim 2,
10 characterized in that the said pointed element consists
of one or more blades having the shape of an isosceles
triangle, and being fastened by their bottom end to an
annular base element (204).

15 5. A fitted up vessel according to Claims 2 to 4,
characterized in that the said crate-like element
supporting the device (4) for opening and emptying a
concentrated liquid detergent container (8), comprises
an upper annular element or border (604) which is secured
20 to the mouth portion (2), respectively to an element (3)
associated to the mouth portion (2) of vessel (1), and a
set of downwardly inwardly extending strips (504) which
by their upper end are made integral of the said annular
element (604), and by their opposite lower end are
25 connected to a bottom element (404) made integral of the
said annular base element (204).

6. A fitted up vessel according to Claim 1,
characterized in that it comprises a vessel (1) for
30 containing the diluting liquid, the said vessel (1) being

provided with a cylindrical mouth portion (2); a cylindrical ring nut (3) which is permanently fittable in a non-rotatable and non-disassemblable manner on the said mouth portion (2), the said ring nut being provided at its top end section
5 with a pouring spout (6), and on its inner skirt with a screw thread (5) extending over the area connected with the said pouring spout (6); an apertured crate-like element which by its upper border is fastened to an intermediate portion of said ring nut inner skirt, in correspondence of,
10 or just below the plane delimiting the lower end of said pouring spout (6), the said crate-like element extending downwards at the interior of said ring nut (3), as far as the lower rim of said ring nut (3); a device (4) for opening and emptying a concentrated liquid detergent
15 container (8), which device is in form of a hollow pyramidal element apertured walls, and being fixed by its base to the bottom of the said crate-like element, and extending in the upward direction substantially over the entire height of said ring nut (3), the apex of the said pyramidal element
20 being substantially co-axial to the said mouth portion (2); a screw plug (7) which is screwable on the threaded portion of said ring nut (3), with its lower border being susceptible of cooperating, any time the said plug is set into its fully screwed down position, with the upper border (604) of the
25 said crate-like element, respectively with a piece being associated with the said border (604), so as to intercept the liquid flow from the said vessel (1) to the said pouring spout (6), whereas, any time the said plug (7) is set into its partly unscrewed position, a flow communication will be
30 established between the vessel (1) and the pouring spout (6);

and a concentrated detergent single-dose container (8) in form of a pot which is closed at one end by a sheet material being easily tearable by the said device (4), and which is to be inserted into the said crate-like element with its tearable bottom being turned toward the said opening device (4), and is to be pressed down against the said opening device (4), as far as to cause the border of its opened bottom to bear against the bottom of said crate-like element.

7. A fitted up vessel according to Claim 6, characterized in that the said cylindrical mouth portion (2) is provided on its outer top end surface with a radially outwardly projecting annular rib (102) having a cross-sectional profile substantially in form of a triangle with its base turned downward, and it is furthermore provided on its outer skirt with a series of grooves being parallel to each other and to the directrices of the mouth portion (2) cylindrical skirt, and in that the said cylindrical ring nut (3) is provided at an intermediate zone of its inner skirt with a groove (103) having a profile that is complementary to the profile of rib (102) on the mouth portion (2), and it is furthermore provided on its inner skirt lower section, below the said groove (103), with a series of parallel grooves (203) being complementary to the grooves (202) on the mouth portion (2), whereby once the ring nut (3) has been fitted on the mouth portion (2), such a restrained engagement between the said pieces will be achieved that their axial unthreading and their relative rotation will be prevented.

8. A fitted up vessel according to Claim 6, characterized in that the said ring nut (3) and the said mouth portion (2) of vessel (1) are permanently engaged with each other by glueing.

5

9. A fitted up vessel according to the preceding Claims, characterized in that the said vessel is provided with a handle for gripping it.

10

10. A fitted up vessel according to Claim 9, characterized in that the said vessel-gripping handle is obtained through the provision of two built-in opposed wide recesses in the vessel body (1).

15

11. A fitted up vessel according to the preceding Claims, made as a whole or in part of plastics.

20

12. A fitted up vessel according to the preceding Claims, in which the said single-dose container comprises a cylindrical body made of a plastics foil, which is closed at its one end by a convex end cap, and is provided at its other end with a radially outwardly projecting annular flange upon which a sheet (11) of an easily tearable material is stretched and tightly fastened.

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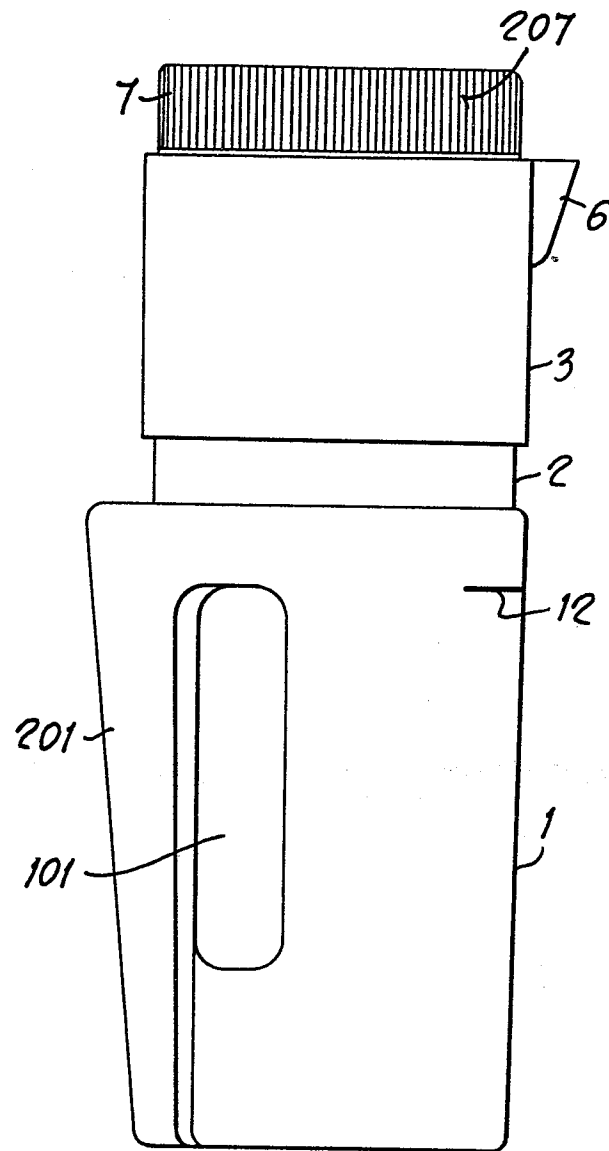
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Fig. 1

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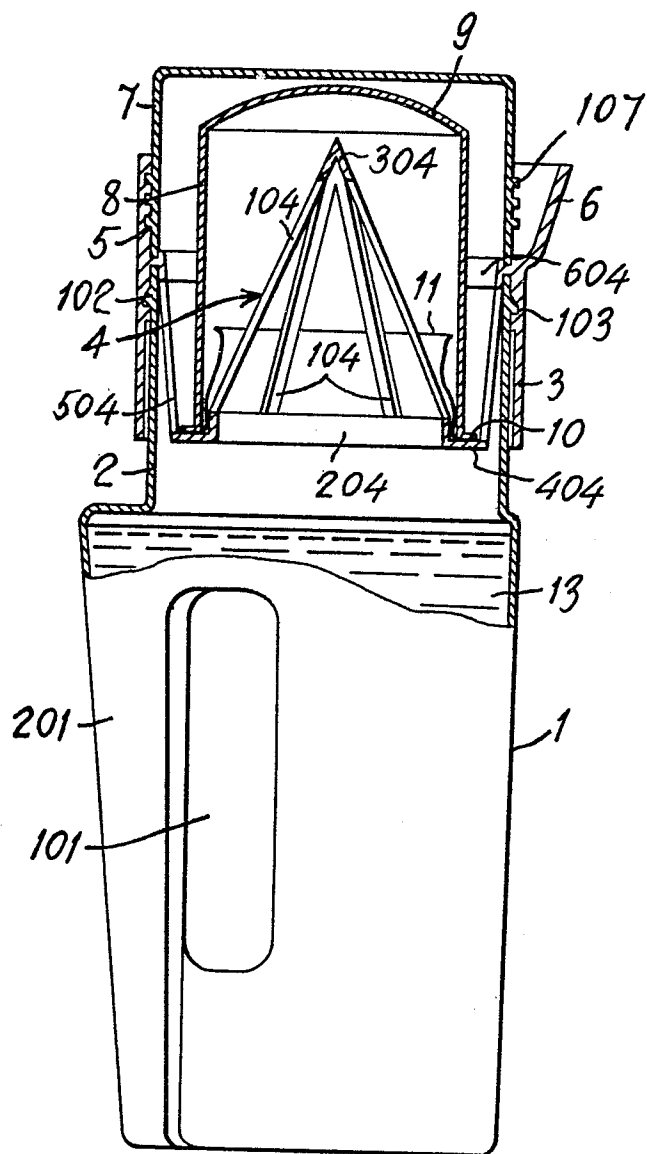


Fig. 2

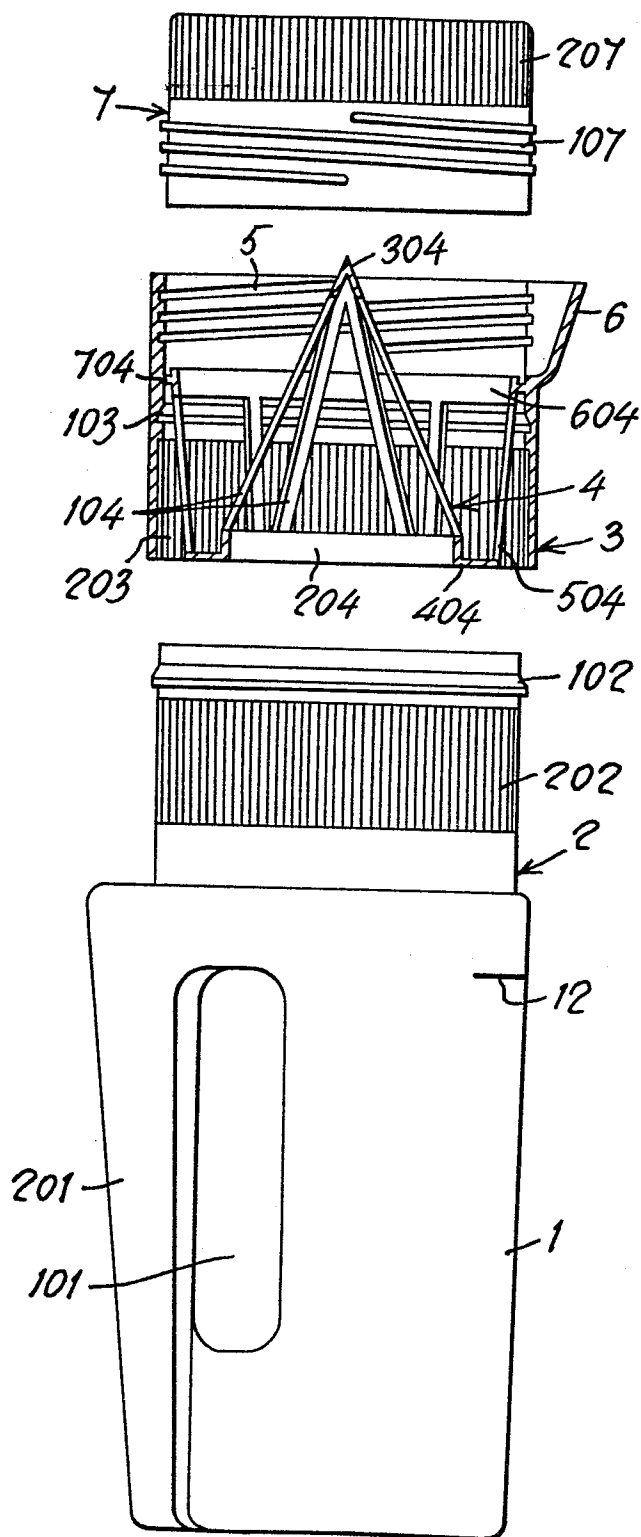


Fig. 3

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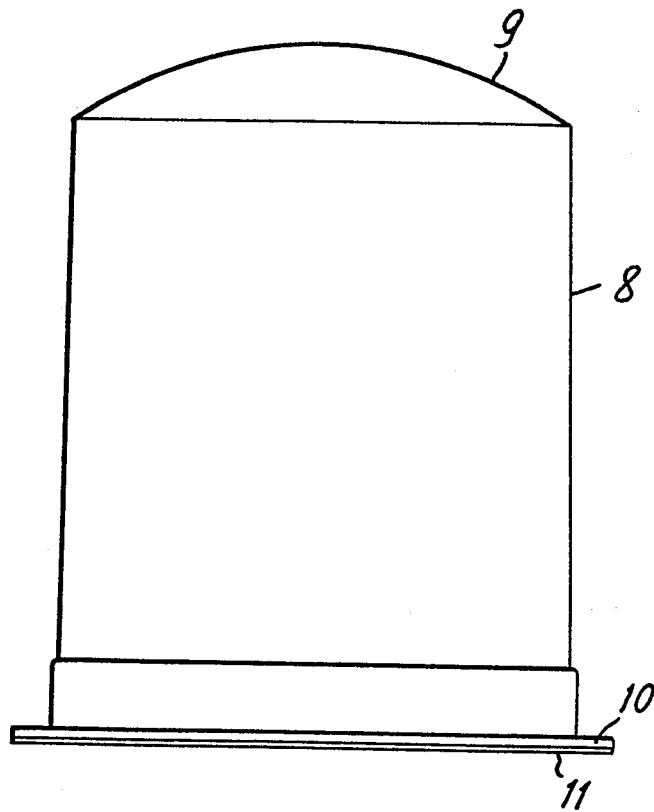


Fig. 4