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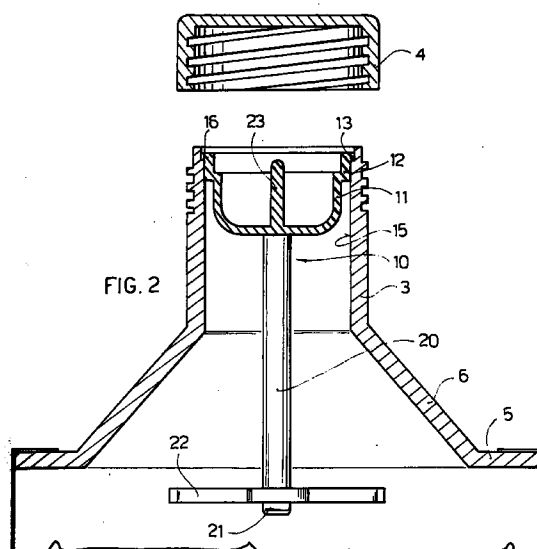
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(54) **Anti-spill device for liquid containers**

(57) An anti-spill device for liquid containers, in particular for dense or viscous liquids, consisting of a cup-shaped element (11) or under-cap, of elastic material, inserted in the spout (3) of the container and forming a liquid seal, withstanding a pressure at least equal to the pressure exerted by the weight of the liquid held in the container (1) on said cup-shaped element (11), so that the container can be overturned without there being any separation of the under-cap (11), which occurs only following an increase in the pressure inside the container, caused for example by squeezing the side wall (14) thereof, the under-cap (11) being connected, by means of a rod-shaped extension (20) to radial elastic fins (22), such as to avoid complete detachment of the anti-spill device from the container.



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## Description

The present invention relates to an anti-spill device for liquid containers, in particular for dense or viscous liquids, such as engine oil, liquid soap, sauces and the like.

As is known, a problem that occurs when liquid is poured from a container is spurting of the liquid which tends to splash the user.

This problem is more marked in semi-rigid containers, of plastic or composite material, which are deformed by manual pressure during handling, causing a reduction in the internal volume and a consequent outflow of product during the tipping stage.

The problem is strongly felt today, in that for economic and especially ecological reasons there is a tendency to make the containers as light as possible.

The problem of splashing of liquid, however, occurs even if the container is substantially rigid during overturning thereof to pour the contents into an appropriate container, such as, for example, the engine of a vehicle, in the case of engine oils, or a corresponding recipient in the case of refills for liquid soap, sauces and the like.

Another drawback is that some of the contents tend to spill out during the pouring stage, and are thus wasted.

The aim of the invention is to eliminate the aforementioned drawbacks, providing an anti-spill device for liquid containers that prevents liquid from escaping during overturning of the container and allows outflow of liquid only following squeezing of the container, preferably when this is in the upturned position, until a pre-set inside pressure is reached.

The device according to the invention has the characteristics listed in appended independent claim 1.

This device substantially comprises an elastic element, acting as an under-cap that is positioned inside the pouring spout of the container, and provides a liquid seal, withstanding at least the pressure caused by the weight of the liquid held in the container, when this latter is in the overturned position.

Thus, once the outer cap of the container has been removed, the container can be handled and overturned, without any risk of causing liquid to escape.

Outflow of liquid from the container occurs only when a certain deformation force is applied thereto, so as to raise the internal pressure beyond a pre-set limit, which causes the under-cap to become detached from the spout.

The elastic sealing element, or under-cap, advantageously has a rod-shaped extension toward the inside of the container, ending in flexible transverse fins, which prevent the under-cap from becoming detached, and therefore dropping during emptying of the container. This can also be useful in the event of partial use of the liquid in the container.

Further characteristics of the invention will be made clearer by the detailed description that follows, referring to a purely exemplary and therefore non-limiting embod-

iment thereof, illustrated in the appended drawings, in which:

Figure 1 is an axonometric view of an example of a container for liquids;

Figure 2 is a view in cross section of the upper part of the container in Figure 1, taken along the line II-II of this figure, with the outer cap shown exploded;

Figure 3 is a view showing the container with the anti-spill device according to the invention in the upturned position of use.

With reference to these figures, the number 1 indicates as a whole a container for liquids, particularly, but not exclusively, dense or viscous liquids such as engine oils or others.

The container 1 has a parallelepiped shape, with a side handle 2, and is made, in this case, of flexible composite material, so that it can take on a semi-rigid shape.

It is obvious, however, that, for the purposes of the invention, the shape and material of the container 1 are practically of no consequence, and can therefore be any.

In particular, the invention also applies to commercially available containers made of plastic material and the like.

Returning to the container 1 in the appended figures, it has an upper pouring spout 3, tightly closed by a screw cap 4. In the case shown the spout 3 has a tubular cylindrical shape and is connected to the upper wall 5 of the container 1 by means of a conical wall 6.

It is obvious that the spout 3 can be closed with any known system.

According to the invention, an anti-spill device for the liquid held in the container 1 is situated inside the spout 3.

This anti-spill device, indicated as a whole with reference number 10, comprises a cup-shaped element 11, of elastic material such as rubber or the like, acting as an under-cap.

The cup-shaped element or under-cap 11 has a stepped upper edge, with a vertical portion 12, adhering to the inner surface 15 of the spout 3, and a horizontal portion 13, that comes to rest on a shoulder 16 made in the vicinity of the free end of the spout 3.

In this manner, the cup-shaped element or under-cap 11 provides a tight closure of the container 1, withstanding a pre-determined internal pressure in the container, this pressure normally being chosen of a certain magnitude higher than the pressure exerted by the liquid when the container 1 is overturned, so that it is possible for the liquid to leave the container, after removal of the outer cap 4, only following squeezing of the outer wall 14 of the container 1.

The cup-shaped element 11 has an inner rod-shaped projection 20, which is disposed axially to the

container 1 and has radial or transverse fins 22, four in number for example, in the vicinity of its free end 21, their length being greater than the radius of the spout 3, so that during use the under-cap 11 is not completely detached, remaining integral with the container, because of interference of the radial fins 22 with the inner surface of the conical wall 6.

Moreover, inside the cup 11 a stalk 23 is provided, that acts as the gripping element for the user's fingers for possible removal of the anti-spill device 10 from the container, following elastic yielding of the radial fins 22.

Insertion of the device 10 in the container 1, through the spout 3, takes place axially thereto, to cause elastic folding of the fins 22, and thus their passage through the spout 3.

Use of the container 1 with anti-spill device 10 according to the invention takes place as follows.

At the time of use, the screw cap 4 is removed and the container is tilted or upturned, to place its spout 3 in the opening 30 of the recipient into which the liquid in the container 1 must be poured, for example the engine of a motor vehicle, in the case of engine oil.

During tilting or upturning of the container 1, the cup-shaped element or under-cap 11 remains in place inside the spout 3, preventing any escape of liquid.

When the container has been placed in the desired position, the side wall 14 of the container is squeezed gently, until the under-cap 11 separates, remaining constrained to the container 1 by means of the radial fins 22, thus allowing outflow of the liquid, as shown in Figure 3.

Should the liquid in the container 1 not have to be used all at once, the under-cap 11 can be repositioned in the spout 3, and the cap 4 screwed on again, for later use, which will take place in the same way just described.

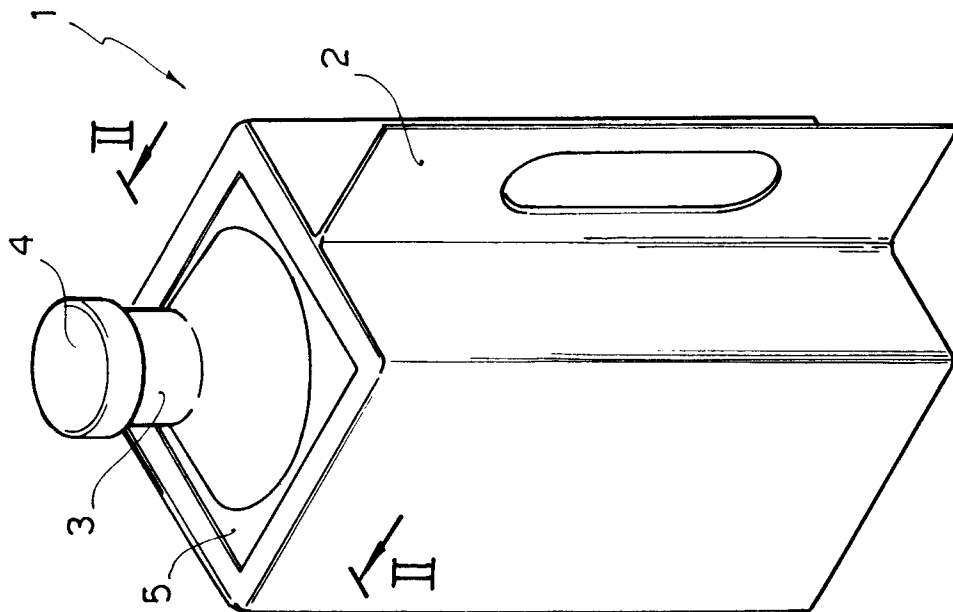
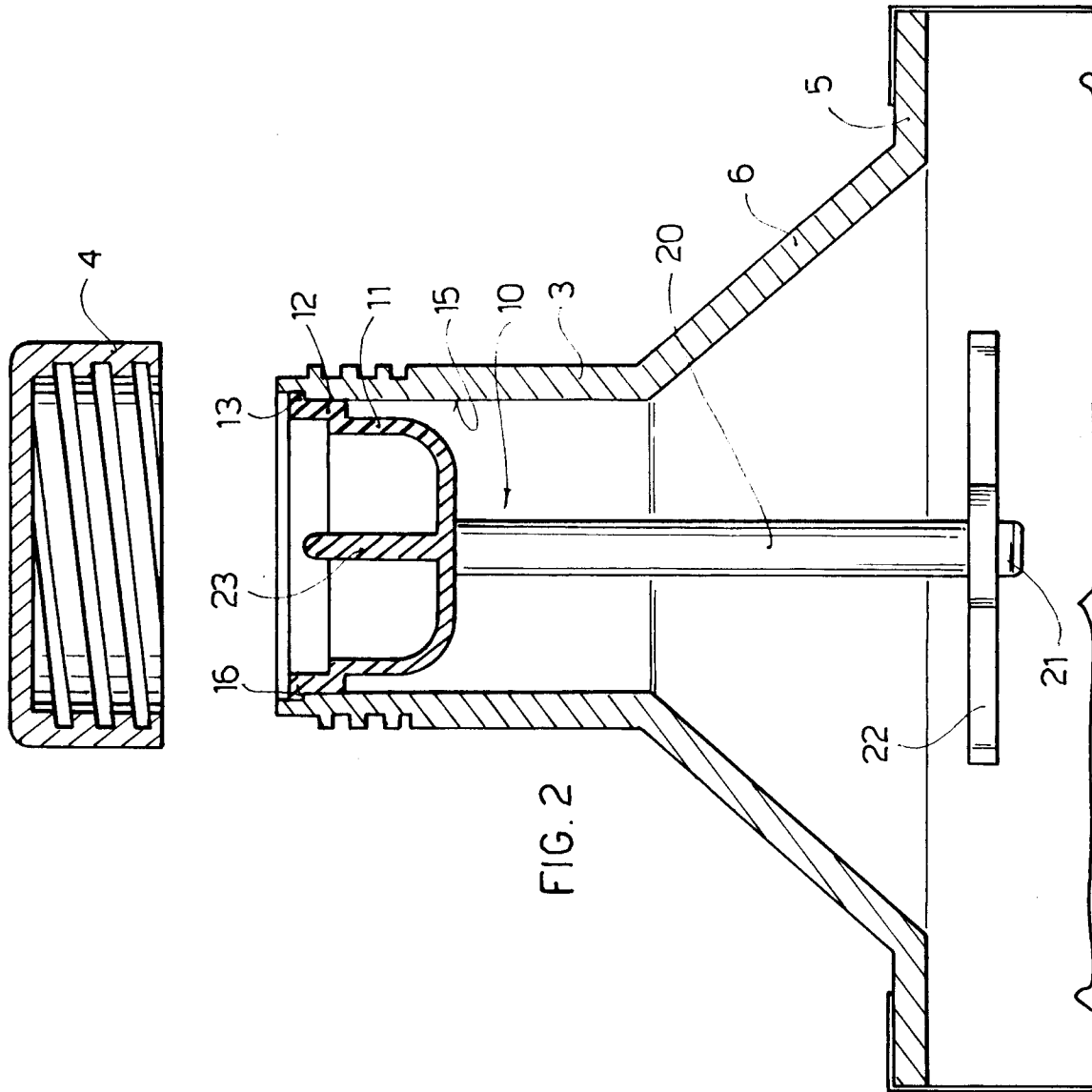
From what is described the advantages of the anti-spill device for liquid containers according to the invention are clear.

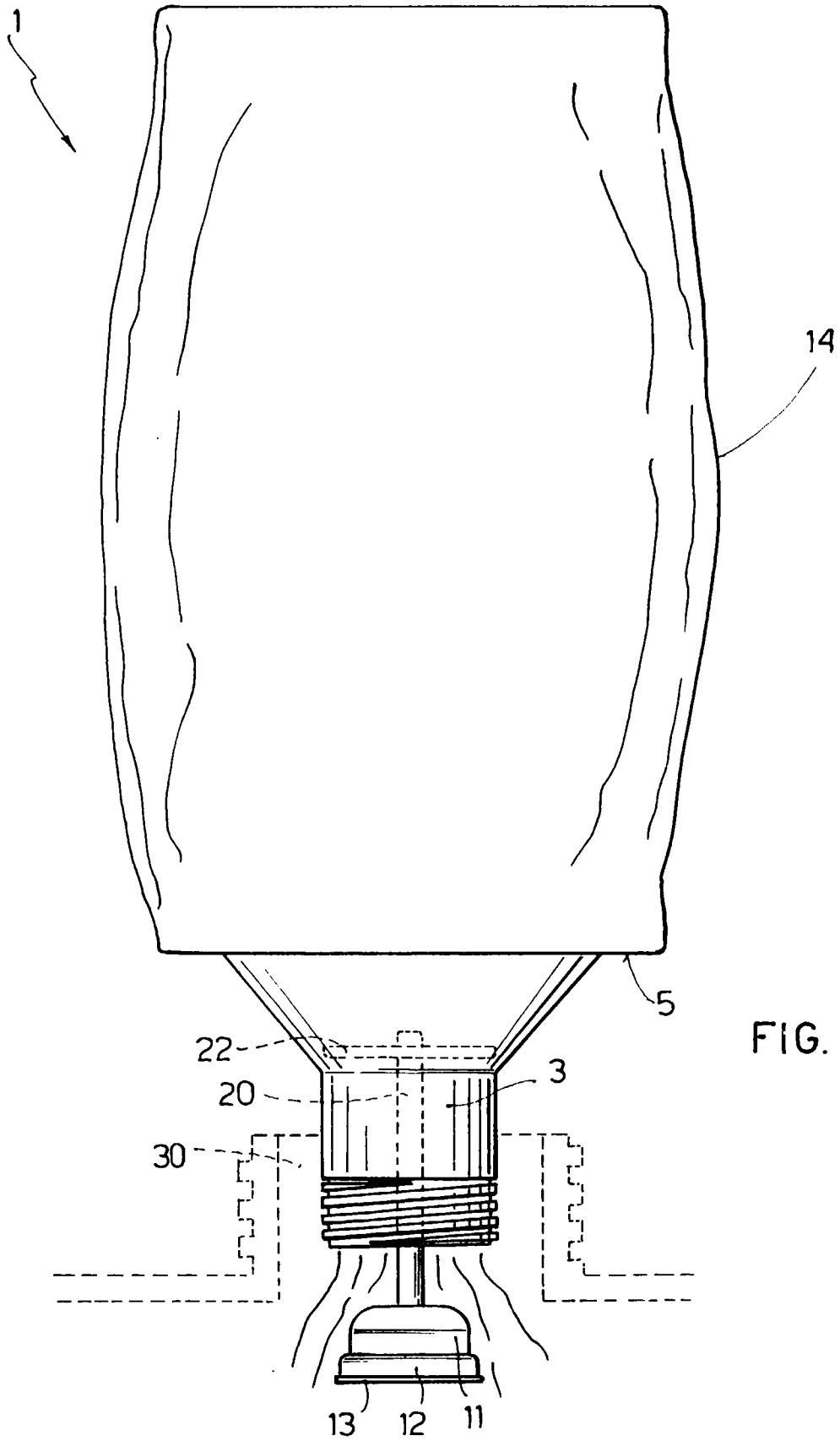
Obviously the invention is not limited to the particular embodiment described above and illustrated in the appended drawings, but numerous changes can be made to the details, without departing from the scope of the invention, as defined by the claims that follow.

## Claims

1. An anti-spill device for liquid containers (1), provided with a pouring spout (3), characterized in that it comprises an element acting as an under-cap, able to close said spout (3) and withstand internal pressures in the container equal to at least the pressure of the weight of the liquid contained therein on said under-cap.
2. A device according to claim 1, characterized in that said element for closing the spout (3) or under-cap is a cup-shaped element (11) inserted in the spout (3).

3. A device according to claim 2, characterized in that said cup-shaped element (11) is made of a material having greater elasticity than that of the spout (3).
4. A device according to claim 3, characterized in that said cup-shaped element (11) is made of rubber or other soft material.
5. A device according to any one of claims 2 to 4, characterized in that said cup-shaped element (11) has a radial projecting edge (13) that abuts against an inner shoulder (16) made in the inner surface of the spout (3).
6. A device according to any one of the preceding claims, characterized in that said under-cap (11) has inner means able to prevent its complete detachment from the container (1).
7. A device according to claim 6, characterized in that said means able to prevent detachment of the under-cap (11) comprise a rod-shaped extension (20) with radial projections (22) of a length at least equal to the radius of the spout (3).
8. A device according to any one of claims 2 to 7, characterized in that said cup-shaped element (11) is provided with a stalk (23) that can be gripped by the user.
9. A device according to any one of the preceding claims, characterized in that said container (1) is of the semi-rigid type and is made of plastic, composite or similar material.
10. A liquid container characterized in that it is provided with an anti-spill device for the liquid according to any one of the preceding claims.







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## EUROPEAN SEARCH REPORT

Application Number  
EP 97 10 5829

| 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.6) |
| X  | US 4 842 152 A (DONEGAN)  | 1-7, 9, 10  | B65D47/20                                    |
| Y  | * the whole document *  | 8   | B65D47/14                                    |
|  | ---   |   | B65D55/16                                    |
| Y  | US 1 721 666 A (LEE)  | 8   |  |
|  | * page 1, line 78 - line 84; figures 2, 4 *                                   |   |  |
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| A  | IT 641 444 A (W. MOLLA)   | 1-10  |  |
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|  | -----   |   |  |
|  |   |   | TECHNICAL FIELDS SEARCHED (Int.Cl.6)         |
|  |   |   | B65D   |
| The present search report has been drawn up for all claims                       |   |   |  |
| Place of search  |   | Date of completion of the search  | Examiner                                     |
| THE HAGUE  |   | 20 August 1997  | Pernice, C                                   |
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