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(54) **Liquid container made of plastic for small amounts of liquid**

Flüssigkeitsbehälter aus Kunststoff für kleine Flüssigkeitsmengen

Réceptient de liquide en matière plastique pour des petites quantités de liquides

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## Description

**[0001]** The invention relates to a liquid container according to the preamble of claim 1.

**[0002]** Such liquid container is known from German patent specification DE-C-3402276 and is typically used for performing measurements on samples contained in the liquid container.

**[0003]** A possible measurement which can for instance be performed on the sample in the liquid container is the determination of the amount of light emitted by the sample as a result of the scintillation effect caused by the radioactivity present in the sample, which can be obtained by radiolabelling a particular substance to be measured in the sample with a radioactive isotope. Such measurement takes place in a measuring chamber, sealed lightproof, of a liquid scintillation counter into which the liquid container is inserted by means of a mechanism. Typically, a number of liquid containers are consecutively introduced into the measuring chamber from a sample changer, with or without the use of a cassette. This may involve two problems. A first problem which may occur is that the liquid container has a projection which is retained on the edge of the measuring chamber. A second problem which may occur is that the liquid container cannot be freely displaced from the sample changer or cassette when the liquid container is released from the sample changer or cassette. This, too, is caused by the presence of projections on the liquid container.

**[0004]** Up to the present, for liquid containers which, for the sake of measurements that are to be performed on the sample, must have no projections, substantially cylindrical containers with a separate, substantially cylindrical sealing cap have been utilized. The drawback of a liquid container of such design is that often no cap is available at the moment when the liquid container should be sealed, or that the caps roll away and get lost. Consequently, the use of liquid containers with loose sealing caps is inconvenient. Furthermore, when an integral sealing cap is provided, the closing and opening of the container must be simple.

**[0005]** The object of the invention is to provide a liquid container for samples on which measurements are to be performed, which liquid container does not have the above-described problems.

**[0006]** To this end, the invention is characterized by the features of claim 1.

**[0007]** Because the connecting lip has a length such that, in the closed position of the cover part, this lip does not extend radially outside the space bounded by the surface of the liquid container, the liquid container does not have a projection which may be caught behind the edge of the measuring chamber or on the sample changer or the cassette from which the liquid container is introduced into the measuring chamber. As the surface of the container part, adjacent the opening and diametrically opposite the connecting lip, is provided with

a beveled side, the opening operation is simplified. This moreover creates a recognizable location for opening the container and also a larger contact area, which substantially simplifies the opening of the liquid container.

As the substantially rotationally symmetrical wall, viewed in circumferential direction, is higher adjacent the connecting lip than at the part of this wall which is located diametrically opposite the connecting lip, the higher part of the rotationally symmetrical wall fits easily into the opening at the start of the closing operation. This simplifies the closing of the cover part. Likewise, in the nearly closed position, the lower part of the wall, which part is located opposite the connecting lip, easily fits into the opening of the container part, because of the slighter height thereof.

**[0008]** It should be noted that EP-A-0 056 469 discloses a hinge between two plastic parts, wherein the hinge in the form of a connecting lip, does not extend outside the bounds of the outer circumference of the parts in a closed position.

**[0009]** Further elaborations of the invention are described in the subclaims and will be specified with reference to the accompanying drawing, wherein:

Fig. 1 is a sectional view taken on line I-I of Fig. 2 of an exemplary embodiment of the liquid container with an opened cover part;

Fig. 2 is a top plan view of the exemplary embodiment of the liquid container with opened cover part shown in Fig. 1; and

Fig. 3 is a side elevation of the exemplary embodiment shown in Figs. 1 and 2 in closed condition.

**[0010]** The liquid container shown is manufactured from synthetic material and is suitable for receiving small amounts of liquid, in particular samples for performing measurements thereon. The liquid container comprises a rotationally symmetrical container part 1 having an opening 2 which is sealable by a cover part 3 formed on the container part 1 via a connecting lip 4. The cover part 3 comprises a cover wall 5 and a substantially rotationally symmetrical wall 6 whose outer surface, at least the part 6a thereof which is remote from the cover wall 5, in a closed position of the cover part 3 abuts fittingly and sealingly against the inner surface of the container part 1. In the exemplary embodiment shown, the container part is of a substantially cylindrical design. It is understood that a conical or a partly conical, partly cylindrical design of the container part is also possible. Obviously, the cover wall 5 may also have a convex configuration. Such a liquid container can for instance be manufactured in one single injection-molding operation.

**[0011]** In accordance with the invention, the connecting lip 4 has a length such that in the closed position of the cover part 3 this lip does not extend radially outside the space bounded by the outer surface of the liquid container 1, 3.

[0012] Thus, the liquid container is prevented from having projecting parts whereby the container, when being placed from a sample changer or a cassette into a measuring chamber, could catch behind anything, as a result of which the liquid container is not completely received in the measuring chamber.

[0013] In order to simplify the opening operation, the surface of the container part 1, adjacent the opening 2 and diametrically opposite the connecting lip 4, is provided with a beveled side 9. This moreover creates a recognizable location for opening the container and also a larger contact area, which substantially simplifies the opening of the liquid container.

[0014] In order to simplify the closing of the cover part 3, the substantially rotationally symmetrical wall 6, viewed in circumferential direction, is higher adjacent the connecting lip 4 than at the part of this wall 6 which is located diametrically opposite the connecting lip 4. When the cover part 3 is being closed, the higher part of the rotationally symmetrical wall 6 fits easily into the opening 2 at the start of the closing operation and likewise, in the nearly closed position, the lower part of the wall 6, which part is located opposite the connecting lip 4, easily fits into the opening 2 of the container part 1, because of the slighter height thereof.

[0015] To ensure that in the closed position of the cover part 3, the connecting lip 4, by its side facing away from the inner space S of the container, is in complete alignment with the outer surface of the container part 1, the outer surface of the container part 1 is provided with a recess 7 wherein, in the closed position of the cover part 3, the connecting lip 4 extends at least at the level of the container part 1. The thickness of the connecting lip 4 and the depth of the recess 7 are chosen so that the side of the connecting lip 4 facing away from the inner space S of the container is in alignment with the outer surface of the container part 1.

[0016] Adjacent the cover wall 5, the rotationally symmetrical wall 6 of the cover part 3 has a rotationally symmetrical part 6b of a slightly greater outer diameter. This slightly greater outer diameter is chosen so that the part 6b does not fit in the opening 2 of the container part 1 and accordingly forms a stop shoulder 6c. It is thus provided that the cover part 3 is always pressed equally far into the opening 2 of the container part 1, so that the connecting lip 4 can never bulge and extend outside the space bounded by the outer surface of the liquid container 1, 3 caused by the cover part 3 being pressed too far into the opening 2.

[0017] As is clearly shown, the outer diameter of the cover wall 5 is preferably equal to the outer diameter of the container part 1 adjacent the opening 2 thereof, so that the cover wall 5 forms a collar 8 outside the substantially rotationally symmetrical wall 6. On the side of the collar 8 which, in the closed position of the cover part 3, faces the container part, the connecting lip 4 is formed thereon. In this manner, it is provided that the connecting lip 4 is also located within the continuation of the imaginary

inary cylindrical space defined by the outer surface of the cover wall 5, so that the part of the connecting lip 4 which does not fit into the recess 7 does not form a projection either.

[0018] Owing to the presence of the collar 8 having the same diameter as the outer surface of the container part 1, the liquid container can moreover be opened in a simple manner without this requiring a projection extending outside the imaginary cylindrical space defined by the outer surface of the liquid container 1, 3.

## Claims

1. A liquid container manufactured from plastic, for small amounts of liquid, comprising a substantially rotationally symmetrical container part (1) having an opening (2) which can be closed with a cover part (3) formed on the container part (1) via a connecting lip (4), the cover part (3) comprising a cover wall (5) and a substantially rotationally symmetrical wall (6) whose outer surface, at least the part (6a) thereof remote from the cover wall (5), in a closed position of the cover part (3) fittingly and sealingly abuts against the inner surface of the container part (1), **characterized in that** the connecting lip (4) has a length such that in the closed position of the cover part (3), said lip does not extend radially outside the space bounded by the outer surface of the liquid container (1, 3), **in that** the substantially rotationally symmetrical wall (6), viewed in circumferential direction, is higher adjacent the connecting lip (4) than at the part of said wall which is located diametrically opposite the connecting lip (4), and **in that** the surface of the container part (1) adjacent the opening (2) and diametrically opposite the connecting lip (4) is provided with a beveled side (9).
2. A liquid container according to claim 1, **characterized in that** the outer surface of the container part (1) is provided with a recess (7), in which recess (7), in the closed position of the cover part (3), the connecting lip (4) extends at least to the level of the container part (1).
3. A liquid container according to claim 2, **characterized in that** the thickness of the connecting lip (4) and the depth of the recess (7) are such that in the closed position of the cover part (3), the side of the connecting lip (4) facing away from the inner space (S) of the container is in alignment with the outer surface of the container part (1).
4. A liquid container according to any one of claims 1-3, **characterized in that** adjacent the cover wall (5), the rotationally symmetrical wall (6) of the cover part (3) comprises a rotationally symmetrical part (6b) of a slightly greater outer diameter, so that said

part (6b) does not fit into the opening (2) of the container part (1) and forms a stop shoulder (6c).

5. A liquid container according to any one of claims 1-4, **characterized in that** the outer diameter of the cover wall (5) is equal to the outer diameter of the container part (1) adjacent the opening (2) thereof, so that the cover wall (5) forms a collar (8) outside the substantially rotationally symmetrical wall (6), on which collar (8) the connecting lip (4) is formed on the side of the collar (8) which, in the closed position of the cover part (3), faces the container part (1).

#### Patentansprüche

1. Flüssigkeitsbehälter aus Kunststoff, für kleine Flüssigkeitsmengen, mit einem im wesentlichen dreh-symmetrischen Behälterteil (1) mit einer Öffnung (2), die mit einem Deckelteil (3) verschließbar ist, der über eine Verbindungslippe (4) an dem Behälterteil (1) ausgebildet ist, wobei der Deckelteil (3) eine Abdeckwand (5) und eine im wesentlichen dreh-symmetrische Wand (6) aufweist, deren Außenfläche, zumindest der von der Abdeckwand (5) entfernt gelegene Teil (6a) der Außenfläche, in der Schließposition des Deckelteils (3) passend und dichtend an der Innenfläche des Behälterteils (1) anliegt,  
**dadurch gekennzeichnet, dass** die Verbindungslippe (4) eine derartige Länge hat, dass in der Schließposition des Deckelteils (3) die Lippe nicht radial außerhalb des durch die Außenfläche des Flüssigkeitsbehälters (1,3) begrenzten Raums vorsteht, dass die im wesentlichen dreh-symmetrische Wand (6) in Umfangsrichtung betrachtet an der Verbindungslippe (4) höher ist als an dem Teil der Wand, welcher der Verbindungslippe (4) diametral gegenüberliegt, und dass die an der Öffnung (2) gelegene und der Verbindungslippe (4) diametral gegenüberliegende Oberfläche des Behälterteils (1) mit einer abgeschrägten Seite (9) versehen ist,
2. Flüssigkeitsbehälter nach Anspruch 1, **dadurch gekennzeichnet, dass** die Außenfläche des Behälterteils (1) mit einer Vertiefung (7) versehen ist, in der in der Schließposition des Deckelteils (3) die Verbindungslippe (4) mindestens bis zu der Höhe des Behälterteils (1) verläuft.
3. Flüssigkeitsbehälter nach Anspruch 2, **dadurch gekennzeichnet, dass** die Dicke der Verbindungslippe (4) und die Tiefe der Vertiefung (7) derart bemessen sind, dass sich in der Schließposition des Deckelteils (3) die dem Innenraum (S) des Behälters abgewandte Seite der Verbindungslippe (4) in Ausrichtung mit der Außenfläche des Behälterteils

(1) befindet.

4. Flüssigkeitsbehälter nach einem der Ansprüche 1-3, **dadurch gekennzeichnet, dass** an der Abdeckwand (5) die dreh-symmetrische Wand (6) des Deckelteils (3) einen dreh-symmetrischen Teil (6b) mit einem geringfügig größeren Außendurchmesser aufweist, derart, dass der Teil (6b) nicht in die Öffnung (2) des Behälterteils (1) passt und eine An-schlagschulter (6c) bildet.
5. Flüssigkeitsbehälter nach einem der Ansprüche 1-4, **dadurch gekennzeichnet, dass** der Außendurchmesser der Abdeckwand (5) gleich dem Außendurchmesser des Behälterteils (1) an dessen Öffnung (2) ist, derart, dass die Abdeckwand (5) einen außerhalb der im wesentlichen dreh-symmetrischen Wand (6) angeordneten Kragen (8) bildet, an dem die Verbindungslippe (4) an derjenigen Seite des Kragens (8) ausgebildet ist, die in der Schließposition des Deckelteils (3) dem Behälterteil (1) zugewandt ist.

#### Revendications

1. Récipient de liquide fabriqué à partir de matière plastique et destiné à de petites quantités de liquide, comprenant une partie (1) de récipient ayant pratiquement une symétrie de rotation et possédant une ouverture (2) qui peut être fermée par une partie (3) de couvercle formée sur la partie du récipient (1) avec une lèvre (4) de liaison, la partie de couvercle (3) comprenant une paroi (5) de couvercle et une paroi (6) ayant pratiquement une symétrie de rotation dont une surface externe, dans une partie au moins (6a) distante de la paroi du couvercle (5) en position fermée de la paroi du couvercle (3), est en butée de manière ajustée et étanche contre la surface interne de la partie de récipient (1), **caractérisé en ce que** la lèvre de liaison (4) a une longueur telle que, dans la position fermée de la partie de couvercle (3), la lèvre ne s'étend pas radialement à l'extérieur de l'espace délimité par la surface externe du récipient de liquide (1, 3), **en ce que** la paroi (6) ayant pratiquement une symétrie de rotation, vue en direction circonférentielle, est plus haute près de la lèvre de liaison (4) que dans la partie de paroi diamétralement opposée à la lèvre de liaison (4), et **en ce que** la surface de la partie de récipient (1) adjacente à l'ouverture (2) est diamétralement opposée à la lèvre de liaison (4) et munie d'un bord chanfreiné (9).
2. Récipient de liquide selon la revendication 1, **caractérisé en ce que** la surface externe de la partie de récipient (1) possède une cavité (7), et, en position de fermeture de la partie de couvercle (3), la lèvre

de liaison (4) s'étend dans cette cavité (7) au moins au niveau de la partie de récipient (1).

3. Récipient de liquide selon la revendication 2, **caractérisé en ce que** l'épaisseur de la lèvre de liaison (4) et la profondeur de la cavité (7) sont telles que, dans la position fermée de la partie de couvercle (3), le côté de la lèvre de liaison (4) placé du côté opposé à l'espace interne (S) du récipient est aligné sur la surface externe de la partie de récipient (1). 5 10
4. Récipient de liquide selon l'une quelconques des revendications 1 à 3, **caractérisé en ce que**, près de la paroi du couvercle (5), la paroi (6) à symétrie de rotation de couvercle (3) comprend une partie (6b) à symétrie de rotation de diamètre externe légèrement plus grand afin que ladite partie (6b) ne pénètre pas dans l'ouverture (2) de la partie de récipient (1) et forme un épaulement d'arrêt (6c). 15 20
5. Récipient de liquide selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** le diamètre externe de la paroi de couvercle (5) est égal au diamètre externe de la partie de récipient (1) près de son ouverture (2), si bien que la paroi de couvercle (5) forme un collier (8) à l'extérieur de la paroi (6) ayant pratiquement une symétrie de rotation, la lèvre de liaison (4) étant formée sur le collier (8) du côté du collier (8) qui est tourné vers la partie de récipient (1) dans la position de fermeture de la partie de couvercle (3). 25 30

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