

Description

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

The invention relates generally to containers having a plurality of component containers or compartments for containing a variety of dissimilar substances. More particularly, the invention relates to a dual compartment container for containing and isolating two separate substances and facilitating their mixture just before use by a consumer.

DESCRIPTION OF PRIOR ART

Dual compartment containers have been used in the past to ship and store products having component substances which must be kept separated until immediately prior to use. The separation may be necessitated for a variety of reasons. For example, separation may be necessary to extend the shelf life of a product because the component materials begin to degrade a short time after they have been mixed. Also, separation is necessary for products having component materials which create unacceptable or dangerous pressure within the container after they are mixed. In some situations, dual compartment containers are used merely to enable the mixing of the component materials within a common compartment and dispensing same from a common spout without the necessity of manually pouring the contents of one container into another container prior to use. This avoids spillage which, in addition to being unpleasant for consumers, may create a safety hazard if caustic substances are to be mixed. Spillage may also unacceptably change the ratio of the component materials required for producing a satisfactory product.

One example of a dual compartment, common spout container is shown in U.S. Patent No. 4,465,183. The dual compartment container shown in this patent is intended for a hair coloring product where each compartment contains a different liquid. The known container has a first and a second compartment, with both compartments including threaded neck portions and pierceable membranes, a sleeve-like intermediate member for threadably engaging both threaded neck portions, knife means for breaking the membranes and a cap for sealing an opening of the second compartment. A removable cylindrical pine is located between the intermediate member to keep the compartments at a distance from each other. Prior to use, the consumer removes the removable cylindrical pine spacing the containers axially and turns the containers towards each other thereby activating the knife means formed at the upper and lower com-

partment to cut the membranes.

From the FR-A-2 569 666, a dual compartment container is known comprising a first container, a second container, an intermediate member having two knife members for cutting a membrane at the bottom of the second container and a cap including the second container and a spout sealed by a nouse or a second cap. The cap is threadably engaged with the intermediate member. A spacing piece is formed between the cap and the intermediate member to maintain the cap the second container and the intermediate member located above the first container separated during shipment and prior to use.

There are several disadvantages with both containers mentioned above. For example, the lateral motion of the knife member relative to the membrane during the cutting action may tear the membrane and, therefore, interferes with the mixing of the contents, especially if the component substances are somewhat viscous liquids. The known containers utilize a spacing piece or a breakable partition to maintain the containers separated during shipment, thus adding to the cost. Furthermore, the intermediate member which is used to hold and screw the containers together as they are being threaded toward each other is also an extra piece which adds to the complexity and cost of the device. For a consumer, a serious deficiency of the disclosed dual compartment containers is that these types of container require a three-step operation prior to use: (1) the user must remove the spacing piece, (2) screw the containers together, and then (3) remove the cap sealing the spout. For user convenience, a fewer number of operations would be preferable.

To overcome the disadvantages of the prior art, it is an object of this invention to provide a dual compartment container wherein only a single operation is required by the user to open the container and prepare the contents for use.

It is another object of this invention to provide a dual compartment container having an annular internal knife member for piercing a sealing membrane.

It is still another object of this invention to provide a dual compartment container having an annular internal knife member for piercing a sealing membrane without any relative lateral motion between the knife and the membrane.

It is yet another object of this invention to provide a dual compartment container having an annular internal knife member for piercing a sealing membrane as the cap of the container is being removed.

It is also an object of this invention to provide a dual compartment container that may perform its intended shipping, separating and mixing functions

without the need for auxiliary spacing pieces to maintain separation of component parts prior to use.

These objects of the invention are produced by the dual-compartment container as defined in claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS.

Figure 1 is an exploded elevation view of a preferred embodiment of the invention, partly in cross-section.

Figure 2 is an elevation view of the parts of Figure 1 assembled, partly in cross-section.

Figure 3 is a cross-section of the lower container of the invention taken along the line 3-3 of Figure 1.

Figure 4 is a cross-section of the knife member of the invention taken along the line 4-4 of Figure 1.

Figure 5 is a cross-section of the upper container of the invention taken along the line 5-5 of Figure 1.

Figure 6 is a cross-section of the cap of the invention taken along the line 6-6 of Figure 1.

Figures 7a and b are cross-sectional views of the dual compartment container showing the change in position of the internal knife member before the sealing membrane is pierced (Figure 7a) and after (Figure 7b).

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to Figure 1, there is shown an axially exploded view of the various components of dual compartment container 10. Container 10 includes a bottom container 12, a top container 14, the open bottom end of which is sealed by a membrane 16, an annular knife member 18 interposed between the top and bottom containers and a cap member 20. The various components of Figure 1, when assembled, appear as shown in Figure 2.

Bottom container 12 includes a body portion 30 for containing a first fluid or other substance and a cylindrical neck portion 32 having a plurality of spiral threads 34 on the external surface thereof. Container 12 may be made of flexible material, for example, injection-molded low density polyethylene to facilitate dispensing of the contents during use. Threads 34 are designed for mateable engagement with multiple start threads 36 on the interior of cap member 20. As will be understood below, container body 30 may, if desired, be other than cylindrical since the only relative rotation required between various adjacent components occurs with respect to neck portion 32 which must be cylindrical.

The interior of neck portion 32 has four helical ramps 40, 41, 42 and 43 (best seen in Figure 3) integrally molded therewith and extending radially inwardly. The leading edge 50 of each ramp abuts the trailing edge 52 of the adjacent ramp. If desired, a gap 51 may be created between adjacent ramps to assist drainage of fluid as will be better understood below.

Annular knife member 18 (made of a material such as polystyrene, for example, to maintain a cutting edge) has a cylindrical side wall 60 having an exterior surface 62 and an interior surface 63 provided with longitudinal splines 64 about its periphery. The outside diameter of surface 62 is slightly less than the inside diameter created by the most radially inward edges of ramps 40, 41, 42 and 43. The exterior surface 62 of knife member 18 has four cams 66, 67, 68 and 69 (best seen in Figures 1 and 4) integrally molded with side wall 60 adjacent the top annular edge 70 of knife member 18. Cams 66, 67, 68 and 69 extend radially outwardly from surface 62 a sufficient distance to overlap ramp surfaces 40, 41, 42 and 43.

Knife member 18 includes an inwardly extending annular ledge 74 transverse to the bottom edge of side wall 60. Annular ledge 74 has a plurality of drainage apertures 76 (best seen in Figure 4) spaced about the periphery thereof. The inner most edge of annular ledge 74 is provided with substantially annular knife surface 77 which, in the preferred embodiment, comprises a plurality of upwardly extending knife edges 78a, 78b, 78c, 78d, 78e and 78f extending less than 360°. The cutting points of the knife edges are located on the most radially inward side of knife surface 77. In the preferred embodiment, knife surface 77 has a small, almost imperceptible inwardly extending taper such that the portion thereof distal to ledge 74 is more radially inward than the portion adjacent ledge 74. As will be understood below, the structure of knife surface 77 produces a cut in membrane 16 with a diameter small enough to drop through knife member 18. A gap 79 is provided so, as will be understood below, the sealing membrane is not totally cut. Each knife edge 78a-f may have a different height above ledge 74 so that only one knife edge will pierce sealing membrane 16 at any one time. The height variations concentrate the piercing force at one knife edge at any one time. The various heights of knife edges 78a-f are also staggered annularly. For example, in order of increasing height the knife edges may be arranged in the following way: 78f, 78e, 78b, 78c, 78a, 78d. Such an arrangement helps to prevent the knife member from tilting and binding during its longitudinal motion.

Top container 14 includes a spout 80 having a central orifice 81, a top portion 82 provided with

longitudinal ratchet teeth 84 about its periphery, a compression sealing bead 86 and a bottom portion 88 provided with longitudinal splines 90 about its periphery. In the preferred embodiment, to save on material requirements splines 90 are provided along discrete arcuate parts of portion 88, for example, at four locations spaced 90° apart as best seen in Figure 5. Container 14 may be made of rigid polyvinyl chloride (PVC), for example, in order to be chemically compatible with the intended contents and to provide a firm support for membrane 16 during piercing.

When the container 10 is assembled, it will be understood that knife member 18 fits into neck portion 32 so that cams 66, 67, 68 and 69 rest upon ramp members 40, 41, 42 and 43. It will be further understood that splines 90 of top container 14 will mesh with splines 64 on the internal surface of knife member 18. Sealing bead 86 is pressed into annular groove 92 in neck portion 32 in order to seal bottom container 12.

Cap member 20 (made of polypropylene, for example) is provided with four pawl members 94, 95, 96 and 97 (best seen in Figure 6) radially inwardly extending from the upper portion of cap member 20. Each pawl member has a longitudinally aligned contact edge 93 at its most radially inward edge for engaging ratchet teeth 84. As best seen in Figures 5 and 6, the orientation of the pawl members and ratchet teeth 84 serves as a one-way ratchet to enable common rotation of cap member 20 and top container 14 only in one direction. Cap member 20 has pre-loaded concave top 98 and a center plug 99 for sealing the orifice of spout 80 while providing a pressure venting capability. In a preferred embodiment, cap member 20 has four, multiple-start threads 36.

Membrane 16 is, in the preferred embodiment, a laminate of several films. For example, the inner layer in contact with the contents of container 14 may be PVC, the middle layer may be aluminum and the outer layer may be low density polyethylene. The requirements for the membrane are that it be chemically compatible with the container contents and sufficiently strong to remain sealed until being pierced and sufficiently rigid to enable it to be pierced. The membrane should also be sufficiently flexible to fall down under the weight of the contents of container 14 and bend about the hinge left by flat portion 79. An additional requirement is that the membrane be resistant to deterioration due to exposure of the laminated edge to the chemicals in the container. This resistance may be achieved by the membrane itself or by providing bottom portion 88 with an annular lip (not shown) intended to wrap around the perimeter of the membrane in conventional, heat sealing fashion.

Assembly of container 10 is straightforward.

Bottom container 12 is filled with a desired liquid or gel and knife member 18 is fed into place within neck portion 32. Knife member 18 is pushed into place so its cams 66, 67, 68 and 69 slide to the trailing edge of ramp surfaces 40, 41, 42 and 43. A slight rotating action is imparted to knife member 18 during assembly to assure that the cams and ramps are properly seated at the lowermost point. Since knife member 18 would be free to move and would only be restrained by gravity and friction, a small radially inwardly extending locating bead 100 is molded into the interior of neck portion 32 above the trailing edge of each ramp to provide a slight interference to axial motion of the knife member. The distance of each bead 100 above its respective trailing edge 52 is slightly greater than the maximum height of cams 66, 67, 68 and 69 in order to provide a friction fit to hold knife member 18 during assembly and shipping. In the preferred embodiment, knife member 18 is, prior to use, approximately 3.2 mm (1/8") below membrane 16. After knife member 18 is in place, top container 14, provided with sealing membrane 16, is inserted so that splines 90 mesh with splines 64 and so that sealing bead 86 is pressed into groove 92. Top container 14 may then be filled with a second liquid, gel or other substance. Cap member 20 is then threaded on to bottom container 12, sealing spout orifice 81 with plug 99 with the one-way ratchet assembly urging top container 14 clockwise so that cam members 66, 67, 68 and 69 will abut the leading edges of ramps 40, 41, 42 and 43 to further assure that knife member 14 does not ride up the ramps until container 10 is ready for use.

Referring now to Figure 7a and 7b, the operation of dual compartment container 10 will be best understood. Figure 7a shows the position of the assembled components prior to use and Figure 7b shows the position of the components after cap member 20 is turned and membrane 16 is pierced. For explanatory purposes only, an index mark 102 is shown on bottom container 12 and an index mark 104 is shown on top container 14. Prior to use, knife member 18 is at its bottom-most point in position 101 with knife edges 78 just below membrane 16. To use container 10 a user need only rotate cap member 20 counterclockwise to disengage threads 34 and 36. This action simultaneously disengages cap member 20 from container 12, unplugs the spout orifice and raises knife member 18 a predetermined distance 106 sufficient to pierce membrane 16. As will be seen by reference to Figure 7b, all these actions result from a simple rotation of cap member 20 relative to container 12 by an arcuate distance "X" sufficient to disengage the threads. In the preferred embodiment, this is about 100°. After the membrane has been cut, it remains secured about a hinge portion which is not

cut because of gap 79 in the knife member.

The arrangement of cams, ramps and splines serves to enable longitudinal motion of knife member 18 relative to top container 14 while limiting relative rotary motion therebetween. Alternative arrangements are possible. For example, the longitudinal motion could also be achieved by providing a radially outwardly extending cam member or lug on knife member 18 and a corresponding arcuate cam track on the interior surface of neck portion 32. The limitation of relative rotary motion could be achieved by a radially inwardly extending cam lug on knife member 18 on a corresponding longitudinal cam track in the top container.

Claims

1. A dual-compartment container (10) for holding a different substance in each compartment, and for isolating the substances until the container is ready to use, comprising a first container (12) having a neck portion (32), a second container (14) axially aligned with said neck portion of said first container and relatively rotatable with respect to said first container, said second container having a bottom, a membrane (16) sealing the bottom of said second container, a knife member (18), interposed between the containers for cutting said membrane upon relative movement of said knife member to said second container supporting said membrane, a cap (20) engaged with said neck portion of said first container and means actuated by rotation of said cap for relative motions of said first and second container (12, 14), said cap (20) and said knife member (18), the bottom of said second container (14) being inserted into said neck portion (32) of said first container (12), characterized in that said neck portion is threaded, said cap (20) threadably engages said neck portion (32), means (84, 94 to 97) are interposed between said cap and said second container for enabling common rotation in a predetermined direction upon threadably disengaging said cap from said first container, said knife member is a separate annular member, means (90, 64) on said second container and said knife member are provided for enabling concurrent rotation, and means (40 to 43, 66 to 69) are provided on said neck portion and said knife member for moving said knife member to pierce said membrane (16) upon rotation of said cap and the subsequent rotation of said second container relative to said first container.

2. The dual-compartment container according to claim 1, characterized in that said means com-

prise ramp means (40, 41, 42, 43) secured to the interior of said neck portion (32) and cam means (66, 67, 68, 69) secured to said knife member (18) for following said ramp means upon rotation of said second container (14) relative to said first container.

3. The dual-compartment container according to claims 1 or 2, characterized in that said means further comprise a first set of longitudinal splines (90) on said second container (14) and a second set of longitudinal splines (64) on said knife member (18), with said second set being adapted to engage said first set thereby limiting rotary motion between said second container (14) and said knife member (18).

4. The dual-compartment container according to one of the claims 1 to 3, characterized in that said means further comprise pawl members (94, 95, 96, 97) on said cap (20) and a ratchet tooth (84) on said second container (14) to enable common rotation of said cap (20) and said second container (14) only in one direction.

5. The dual-compartment container according to one of the claims 2 to 4, characterized in that said ramp means (40 to 43) and said cam means (66 to 69) are provided to translate rotary motion of the cap to longitudinal movement of said knife member (18) relative to said second container (14) upon threadably disengaging said cap (20) from said first container (12).

6. The dual-compartment container according to one of the claims 1 to 5, characterized in that annular sealing means (86) are interposed between said first and said second container (12, 14) allowing a relative rotation therebetween.

7. The dual-compartment container according to one of the claims 1 to 6, characterized in that means (100) for limiting rotary motion of said knife member (18) relative to said second container (14) are provided.

8. The dual-compartment container according to one of the claims 1 to 7, characterized in that said knife member (18) contains a plurality of axially aligned knife edges (78) annularly arranged beneath said membrane (16).

9. The dual-compartment container according to claim 8, characterized in that said knife member (18) comprises a plurality of adjacent arcuate knife edges (78a-f) which together sub-

cut because of gap 79 in the knife member.

The arrangement of cams, ramps and splines serves to enable longitudinal motion of knife member 18 relative to top container 14 while limiting relative rotary motion therebetween. Alternative arrangements are possible. For example, the longitudinal motion could also be achieved by providing a radially outwardly extending cam member or lug on knife member 18 and a corresponding arcuate cam track on the interior surface of neck portion 32. The limitation of relative rotary motion could be achieved by a radially inwardly extending cam lug on knife member 18 on a corresponding longitudinal cam track in the top container.

Claims

1. A dual-compartment container (10) for holding a different substance in each compartment, and for isolating the substances until the container is ready to use, comprising a first container (12) having a neck portion (32), a second container (14) axially aligned with said neck portion of said first container and relatively rotatable with respect to said first container, said second container having a bottom, a membrane (16) sealing the bottom of said second container, a knife member (18), interposed between the containers for cutting said membrane upon relative movement of said knife member to said second container supporting said membrane, a cap (20) engaged with said neck portion of said first container and means actuated by rotation of said cap for relative motions of said first and second container (12, 14), said cap (20) and said knife member (18), the bottom of said second container (14) being inserted into said neck portion (32) of said first container (12), characterized in that said neck portion is threaded; said cap (20) threadably engages said neck portion (32), means (84, 94 to 97) are interposed between said cap and said second container for enabling common rotation in a predetermined direction upon threadably disengaging said cap from said first container, said knife member is a separate annular member, means (90, 64) on said second container and said knife member are provided for enabling concurrent rotation, and means (40 to 43, 66 to 69) are provided on said neck portion and said knife member for moving said knife member to pierce said membrane (16) upon rotation of said cap and the subsequent rotation of said second container relative to said first container.
2. The dual-compartment container according to claim 1, characterized in that said means comprise ramp means (40, 41, 42, 43) secured to the interior of said neck portion (32) and cam means (66, 67, 68, 69) secured to said knife member (18) for following said ramp means upon rotation of said second container (14) relative to said first container.
3. The dual-compartment container according to claims 1 or 2, characterized in that said means further comprise a first set of longitudinal splines (90) on said second container (14) and a second set of longitudinal splines (64) on said knife member (18), with said second set being adapted to engage said first set thereby limiting rotary motion between said second container (14) and said knife member (18).
4. The dual-compartment container according to one of the claims 1 to 3, characterized in that said means further comprise pawl members (94, 95, 96, 97) on said cap (20) and a ratchet tooth (84) on said second container (14) to enable common rotation of said cap (20) and said second container (14) only in one direction.
5. The dual-compartment container according to one of the claims 2 to 4, characterized in that said ramp means (40 to 43) and said cam means (66 to 69) are provided to translate rotary motion of the cap to longitudinal movement of said knife member (18) relative to said second container (14) upon threadably disengaging said cap (20) from said first container (12).
6. The dual-compartment container according to one of the claims 1 to 5, characterized in that annular sealing means (86) are interposed between said first and said second container (12, 14) allowing a relative rotation therebetween.
7. The dual-compartment container according to one of the claims 1 to 6, characterized in that means (100) for limiting rotary motion of said knife member (18) relative to said second container (14) are provided.
8. The dual-compartment container according to one of the claims 1 to 7, characterized in that said knife member (18) contains a plurality of axially aligned knife edges (78) annularly arranged beneath said membrane (16).
9. The dual-compartment container according to claim 8, characterized in that said knife member (18) comprises a plurality of adjacent arcuate knife edges (78a-f) which together sub-



tend less than 360° in order to leave uncut a predetermined hinge portion of said membrane (16) after said membrane (16) is pierced.

10. The dual-compartment container according to claim 8 or 9, characterized in that said knife edges (78a-f) are of successively increasing heights.
11. The dual-compartment container according to one of the claims 8 to 10, characterized in that said knife edges (78a-f) are tapered inwardly to enable the cut portion of said membrane (16) to have a diameter smaller than the diameter of the base of said knife edges (78a-f).
12. The dual-compartment container according to one of the claims 1 to 8, characterized in that said second container (14) has a spout (80) wherein an orifice (81) of said spout (80) is adapted to be sealed by a plug (99) on said cap (20).

Revendications

1. Un récipient à double compartiment (10) pour contenir des substances différentes dans chaque compartiment, et pour isoler les substances jusqu'à ce que le récipient soit prêt à l'usage, comprenant un premier récipient (12) comprenant une partie en forme de col (32), un second récipient (14) en l'alignement axial avec ladite partie en forme de col dudit premier récipient et pouvant effectuer un mouvement de rotation relatif par rapport audit premier récipient, ledit second récipient comprenant un fond, une membrane (16) fermant de façon étanche le fond dudit second récipient, un organe formant couteau (18), interposé entre les récipients, pour couper ladite membrane lors d'un déplacement relatif dudit organe formant couteau vers ledit second récipient supportant ladite membrane, un couvercle (20) venant en prise sur ladite partie en forme de col dudit premier récipient, et des moyens actionnés par la rotation dudit couvercle pour assurer les déplacements relatifs desdits premier et second récipients (12, 14), dudit couvercle (20) et dudit organe formant couteau (18), le fond dudit second récipient (14) étant introduit dans ladite partie en forme de col (32) dudit premier récipient (12), caractérisé en ce que ladite partie en forme de col est filetée, ledit couvercle (20) est vissé en prise sur ladite partie en forme de col (32), des moyens (84, 94 à 97) sont interposés entre ledit couvercle et ledit second récipient pour permettre une rotation commune dans une direction prédéter-

minée lors du dévissage dudit couvercle dudit premier récipient, ledit organe formant couteau étant un élément annulaire séparé, des moyens (90, 64) prévus sur ledit second récipient et ledit organe formant couteau sont prévus pour permettre une rotation concomitante, et des moyens (40 à 43, 66 à 69) sont prévus sur ladite partie en forme de col et ledit organe formant couteau pour déplacer ledit organe formant couteau afin de percer ladite membrane (16) lors de la rotation dudit couvercle et de la rotation ultérieure dudit second récipient par rapport audit premier récipient.

2. Le récipient à compartiment double selon la revendication 1, caractérisé en ce que lesdits moyens comprennent des moyens en forme de rampe (40, 41, 42, 43) fixés à l'intérieur de ladite partie en forme de col (32) et des moyens en forme de came (66, 67, 68, 69) fixés sur ledit organe formant couteau (18) pour suivre lesdits moyens en forme de rampe lors de la rotation dudit second récipient (14) par rapport audit premier récipient.
3. Le récipient à compartiment double selon la revendication 1 ou 2, caractérisé en ce que lesdits moyens comprennent en outre un premier jeu de cannelures longitudinales (90) sur ledit second récipient (14) et un second jeu de cannelures longitudinales (64) sur ledit organe formant couteau (18), ledit second jeu étant adapté pour venir en prise sur ledit premier jeu de manière à limiter ainsi la rotation entre ledit second récipient (14) et ledit organe formant couteau (18).
4. Le récipient à compartiment double selon l'une des revendications 1 à 3, caractérisé en ce que lesdits moyens comprennent en outre des éléments en forme de languette (94, 95, 96, 97) sur ledit couvercle (20) et une dent d'engrènement (84) sur ledit second récipient (14) pour permettre la rotation commune dudit couvercle (20) et dudit second récipient (14) seulement en une direction unique.
5. Le récipient à compartiment double selon l'une des revendications 2 à 4, caractérisé en ce que lesdits moyens en forme de rampe (40 à 43) et lesdits moyens en forme de came (66 à 69) sont prévus pour traduire le déplacement en rotation du couvercle en déplacement longitudinal dudit organe formant couteau (18) par rapport audit second récipient (14) lors du dévissage dudit couvercle (20) dudit premier récipient (12).



6. Le récipient à compartiment double selon l'une des revendications 1 à 5, caractérisé en ce que lesdits moyens annulaires d'étanchéité (86) sont interposés entre lesdits premier et second récipients (12, 14) pour permettre une rotation relative entre les deux. 5
7. Le récipient à compartiment double selon l'une des revendications 1 à 6, caractérisé en ce qu'il est prévu des moyens (100) pour limiter le déplacement en rotation dudit organe formant couteau (18) par rapport audit second récipient (14). 10
8. Le récipient à compartiment double selon l'une des revendications 1 à 7, caractérisé en ce que ledit organe formant couteau (18) contient une pluralité de tranchants (78) alignés axialement, disposés annulairement au dessous de ladite membrane (16). 15 20
9. Le récipient à compartiment double selon la revendication 8, caractérisé en ce que ledit organe formant couteau (18) comprend une pluralité d'arêtes de couteau incurvées adjacentes (78a à 78f) sous-tendant ensemble moins de 360°, de manière à laisser intacte une partie prédéterminée formant articulation de ladite membrane (16) après que ladite membrane (16) a été percée. 25 30
10. Le récipient à compartiment double selon la revendication 8 ou 9, caractérisé en ce que lesdites arêtes de couteau (78a à 78f) sont d'une hauteur croissant successivement. 35
11. Le récipient à compartiment double selon l'une des revendications 8 à 10, caractérisé en ce que lesdites arêtes de couteau (78a à 78f) sont inclinés en oblique vers l'intérieur de manière que la partie coupée de ladite membrane (16) ait un diamètre inférieur au diamètre de la base desdits tranchants (78a à 78f). 40
12. Le récipient à compartiment double selon l'une des revendications 1 à 8, caractérisé en ce que ledit second récipient (14) comprend un goulot (80) dans lequel un orifice (81) est agencé pour être fermé de façon étanche par un bouchon obturateur (99) sur ledit couvercle (20). 45 50

Patentansprüche

1. Zweikammer-Behälter (10) zur Aufnahme einer unterschiedlichen Substanz in jeder Kammer und zum Trennen der Substanzen, bis der Behälter betriebsbereit ist, mit einem ersten 55

Behälter (12), der einen Halsabschnitt (32) aufweist, einem zweiten Behälter (14), der zu dem Halsabschnitt des ersten Behälters axial ausgerichtet und bezüglich des ersten Behälters drehbar ist, wobei der zweite Behälter versehen ist mit einem Boden, einer Membran (16), die den Boden des zweiten Behälters abdichtet, einem Messerkörper (18), der zwischen den Behältern angeordnet ist, um die Membran bei einer Relativbewegung zwischen dem Messerkörper und dem die Membran abstützenden zweiten Behälter durchzuschneiden, einem Deckel (20), der mit dem Halsabschnitt des ersten Behälters in Eingriff steht, und Mitteln, die durch eine Drehung des Deckels zum Zwecke einer Relativbewegung des ersten und zweiten Behälters (12, 14), des Deckels (20) und des Messerkörpers (18) betätigt werden, wobei der Boden des zweiten Behälters (14) in den Halsabschnitt (32) des ersten Behälters (12) eingesetzt ist, dadurch gekennzeichnet, daß der Halsabschnitt mit Gewinde versehen ist, daß der Deckel (20) mit dem Halsabschnitt (32) in Gewindeeingriff steht, daß zwischen dem Deckel und dem zweiten Behälter Mittel (84, 94-97) angeordnet sind, die beim Abschrauben des Deckels vom ersten Behälter eine gemeinsame Drehung in einer vorgegebenen Richtung ermöglichen, daß der Messerkörper ein getrennter ringförmiger Körper ist, daß Mittel (90, 64) an dem zweiten Behälter und dem Messerkörper zum Ermöglichen einer gemeinsamen Drehung vorgesehen sind, und daß an dem Halsabschnitt und dem Messerkörper Mittel (40-43, 66-69) vorgesehen sind, die bei einer Drehung des Deckels und der anschließenden Drehung des zweiten Behälters relativ zum ersten Behälter den Messerkörper so bewegen, daß er die Membran (16) durchsticht.

2. Zweikammer-Behälter nach Anspruch 1, dadurch gekennzeichnet, daß die besagten Mittel aus an der Innenseite des Halsabschnittes (32) befestigten Rampenmitteln (40, 41, 42, 43) und am Messerkörper (18) befestigten Nockenmitteln (66, 67, 68, 69) bestehen, die bei einer Drehung des zweiten Behälters (14) relativ zum ersten Behälter auf den Rampenmitteln reiten.
3. Zweikammer-Behälter nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die besagten Mittel ferner einen ersten Satz längs verlaufender Leisten (90) am zweiten Behälter (40) und einen zweiten Satz längs verlaufender Leisten (64) am Messerkörper (60) umfassen, wobei der zweite Satz mit dem ersten Satz in Eingriff



treten kann, um dadurch die Drehbewegung zwischen dem zweiten Behälter (14) und dem Messerkörper (18) zu begrenzen.

4. Zweikammer-Behälter nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die besagten Mittel ferner Klinkenkörper (94, 95, 96, 97) am Deckel (20) und einen Klinkenzahn (84) am zweiten Behälter (14) umfassen, um eine gemeinsame Drehung des Deckels (20) und des zweiten Behälters (14) nur in einer Richtung zu ermöglichen. 5
5. Zweikammer-Behälter nach einem der Ansprüche 2 bis 4, dadurch gekennzeichnet, daß die Rampenmittel (40-43) und die Nockenmittel (66-69) so ausgebildet sind, daß sie eine Drehbewegung des Deckels beim Abschrauben des Deckels (20) von dem ersten Behälter (12) in eine Längsbewegung des Messerkörpers (18) relativ zu dem zweiten Behälter (14) umwandeln. 10 15 20
6. Zweikammer-Behälter nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß ringförmige Dichtmittel (86) zwischen den ersten und zweiten Behälter (12, 14) eingesetzt sind, um eine Relativedrehung zwischen diesen zu ermöglichen. 25 30
7. Zweikammer-Behälter nach einem der Ansprüche 1 bis 6, dadurch gekennzeichnet, daß Mittel (100) zum Begrenzen der Drehbewegung des Messerkörpers (18) relativ zu dem zweiten Behälter (14) vorgesehen sind. 35
8. Zweikammer-Behälter nach einem der Ansprüche 1 bis 7, dadurch gekennzeichnet, daß der Messerkörper (18) mehrere axial ausgerichtete Messerkanten (78) aufweist, die ringförmig unterhalb der Membran angeordnet sind. 40
9. Zweikammer-Behälter nach Anspruch 8, dadurch gekennzeichnet, daß der Messerkörper (18) mehrere benachbarte gekrümmte Messerkanten (78 a-f) aufweist, die sich gemeinsam um weniger als 360° erstrecken, um einen vorgegebenen Gelenkabschnitt der Membran (16) nach dem Durchstechen der Membran (16) ungeschnitten zu lassen. 45 50
10. Zweikammer-Behälter nach Anspruch 8 oder 9, dadurch gekennzeichnet, daß die Messerkanten (78a-f) aufeinanderfolgend größer werdende Höhen haben. 55
11. Zweikammer-Behälter nach einem der Ansprüche 8 bis 10, dadurch gekennzeichnet, daß die

Messerkanten (78a-f) nach innen geneigt sind, damit der geschnittene Abschnitt der Membran (16) einen kleineren Durchmesser als die Basis der Messerkanten (78a-f) haben kann.

12. Zweikammer-Behälter nach einem der Ansprüche 1 bis 8, dadurch gekennzeichnet, daß der zweite Behälter (14) eine Tülle (80) aufweist, wobei eine Öffnung (81) der Tülle (80) durch einen Stopfen (99) am Deckel (20) verschließbar ist.



* C L M S *