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Description

[0001] The present invention relates to a lid and a cup-shaped receptacle. Such a lid and receptacle combination is disclosed in US 5 253 781. Of the clip-on plastic lid on the cup-shaped receptacle in US 5,253,781 A, the outer surface of the outer leg wall of the lid recess extends downwards just slightly beyond the height position of the constriction. The cone angle and the outer diameter of the outer surface are matched with the cone angle and the inner diameter of the receptacle wall such that outer surface does not get in significant contact with the receptacle wall even when the bead of the receptacle, which is implemented as a curled rim, fully is seated on the clamping groove. Due to the comparatively short outer surface and the large radial dimension of the U-web of the lid recess, the clamping groove tilts inwards during the clip-on movement; this hinders the bead to smoothly move over the whole circumferential length past the constriction. It is necessary to first manually centre the lid with the clamping groove neatly on the bead and then to clip on the lid by pressure directly acting on the upper wall of the clamping groove with a sliding rotating movement of the hand. This clip on action is troublesome, time-consuming and increases the risk that the bead does not properly snap into the clamping groove at some locations along the circumference of the cup opening. This has the effect that liquid may leak through when the full cup is tilted. The lid easily pops off inadvertently if the full receptacle falls over, because the cup opening region easily gets deformed radially.

[0002] It is an object of the present invention to provide a lid which is suitable for a receptacle, by means of which an easy clip-on action can be achieved, even by unskilled persons, such that the clipped on lid provides leakage-proofness and hardly pops off when the full cup falls over. Even though the invention intends to achieve a high lid holding force and perfect tightness, the lid ought to be clipped on easily.

[0003] This is achieved with the lid and receptacle claimed in claim 1.

[0004] Since, according to the invention, the outer leg wall has a relatively long downward extension, the U-web of the lid recess, and the inner leg wall commonly constitute a rigid centring and guide projection which slidingly contacts the receptacle wall at least already while the bead moves past the constriction. The clamping groove automatically is precisely centred on the bead, and the bead is clipped-on virtually at one go and along its whole circumferential length, past the constriction into the clamping groove by applying pressure essentially only on the dome top wall. The sliding contact between the outer surface and the receptacle wall guides the constriction uniformly over the bead, since thanks to guidance and centring, the bead generates uniform resistance against the lid downward movement everywhere. The guiding projection converts the pressure applied to the dome into a downwardly oriented pulling force uniformly distributed along the constriction to pull the constriction uniformly past the bead, until the bead is correctly positioned in the clamping groove. This advantageous effect of the centring and guide projection, which actually is a cone or a cylinder, and the uniform force transmission, in co-action allow to provide a strong force fit between the bead and the clamping groove, said force fit resulting from a relatively narrow dimensioning between the bead and the clamping groove and the given elasticity. This assures that the clipped on lid prevents leakage, and that the bead does not even locally leave the clamping groove if the full cup falls over. The shape of the dome and of the lid recess result in a rigid structure integrated into the lid, by which structure the applied clip-on force effectively clips on the lid without significant buckling of the lid. The clipped on lid markedly stiffens the opening area of the receptacle resulting in excellent spill-proofness and good leakage-proofness as well.

[0005] It is possible to integrate a circumferentially continuously operating hinge mechanism into the lid. This allows to easily clip-on the lid, in practice by a quick grasp of the hand. As soon as pressure is applied at least on the dome top wall, the dome is lowered, the dislocated inner leg wall tilts the U-web downwardly about the hinge formed at the transition between the U-web and the outer leg wall as soon as the resistance to movement of the constriction over the bead starts to increase. The tilting movement of the U-web temporarily tends to pull the outer leg wall away from the inner wall of the receptacle. The contact between the bead and the constriction tilts the constriction outwards and the clamping groove diverges somewhat. Due to the clip-on pressure or, if necessary, by automatically also or alternatively pressing on the outer lid periphery when the dome is pushed downwardly, the bead passes the constriction easily and in one go. When the pressure ceases, the hinge mechanism re-establishes the fit of the lid, i.e., the U-web returns into a position essentially perpendicular to the axis of the lid and firmly holds the outer leg wall against the inner wall of the receptacle. The constriction is returned behind the bead until the bead is in a tight and hermetically sealed force fit in the clamping groove. The upwardly protruding dome allows to actuate the joint mechanisms by first lowering the dome relative to the clamping groove and to open the clamping groove before the bead slips through. Then the dome returns into its initial elevated position. During clip-on the dome top wall may be lowered by the applied pressure until the palm of the hand assists at the lid periphery to easily complete the clip-on action.

[0006] The bead of the receptacle can be formed as a curled bead or a full rolled rim, or a partially curled bead or half rolled rim, or instead as an outwardly bent edge flange. An easy and comfortable clip-on action of the lid is achieved in any case, resulting in the final leakage-proofness and the stable lid holding effect. One lid design fits many bead designs.

[0007] The lid is designed in view to an optimised and easy clip-on action, despite a powerful force fit in the

clipped on condition. Thanks to its shape the lid is relatively stiff in its central region such that the bead easily and completely can be clipped-in the clamping groove into a tight form fit and force fit just by pressing in clip-on direction, assisted by the guidance of the guide projection, and by temporarily opening the clamping groove by a movement of the dome relative to the constriction.

[0008] For this function it may be important that the U-web extends substantially planar and substantially perpendicularly to the lid axis, and that the inner leg wall is substantially parallel to the lid axis. Due to those structural features the integral hinge mechanism is acting well when downward pressure is applied on the lid, mainly since for mechanical reasons the inner leg wall behaves more rigid than the outer leg wall when the U-web is tilted such that consequently the outer leg wall has to yield inwards and then temporarily opens the clamping groove from the inner side.

[0009] It may be expedient when the outer surface slidingly co-operates with the receptacle wall already before the bead starts to deform the constriction elastically. This has the effect that the clamping groove and the constriction, respectively, are put over the bead at a neatly centred position so that the bead will have to overcome essentially the same resistance to passage over its whole circumferential length and therefore easily and uniformly is clipped into the clamping groove.

[0010] When the cone angles of the outer surface and of the receptacle wall are approximately identical, the outer diameter of the outer surface should correspond, at the height position of the constriction, at least approximately to the inner diameter of the receptacle wall in the opening area so that the centring and guide effect already starts before the bead reaches the constriction. When the bead snaps into the clamping groove, especially the softer material of the receptacle will yield in the bead and in the receptacle wall so that a strong positive engagement will be established, when the lid is clipped-on. Additively or alternatively, also the outer leg wall of the lid recess may slightly yield inwards, as a consequence of the contact pressure between the outer surface and the receptacle wall.

[0011] The outer diameter of the outer surface in the clamping groove is larger than the inner diameter of the receptacle wall in the opening area, i.e. where the inner wall curves outwardly into the bead. This measure guarantees that during the whole movement of the bead past the constriction into the clamping groove a significant guidance and centring will take place. A diameter oversize depending on the size of the receptacle, may be expedient.

[0012] A markedly downward extension of the outer surface beyond the height position of the constriction is important for the intended centring and guiding effect. The lid may be clipped-on by mere application of pressure substantially only on the dome. The outer surface may have at least 2.5 times the height of the clamping groove. Providing 3 times the height, or even 4 times the height of the clamping groove may be still better. It is to be noted that, due to the pressure between the outer surface and the receptacle wall and by a large contact area an extremely effective sealing effect will result complementary to the sealing effect of the bead in the clamping groove.

[0013] A cone angle between approx. 6° and 12°, i.e. an overall cone angle between approx. 12° and 24°, may be expedient. A preferred angle range amounts to between approx. 8° and 10°, i.e. between approx. 16° and 20° in total. Also smaller cone angles are possible

[0014] Depressions formed where the top of the dome top wall merges with the outer dome wall facilitate the easy clip-on action of the lid and increase the rigidity of the dome. Furthermore, the depressions provide visual clues where to apply the fingers and define gripping spots for comfortably removing the lid from a lid-stack. Undercut depressions do not only provide a hand grip, but even may define lid stacking shoulders. Each lid may only rest with the shoulders of the depressions on the dome top wall of the next lid such that the lids in the stack can not get jammed.

[0015] In order to achieve the strong force fit between the bead and the clamping groove, which is important for the sealing effect, the radial thickness of the bead should be larger than the radial interior width of the clamping groove. The soft paper or paperboard material of the receptacle and the material of the bead, respectively, yield on the inner side and on the outer side as soon as the bead is seated in the clamping groove. Squashed zones with planar contact areas, i.e. not only line contacts, result in an improved sealing effect.

[0016] The radial thickness of the bead should be between 10% and 20%, preferably approx. 15%, larger than the average radial interior width of the clamping groove. This dimensioning results in a good sealing effect and, simultaneously, only moderate forces will be necessary for clipping the lid onto the receptacle.

[0017] In order to enhance the holding effect of the lid on the bead and to gradually squash the material, the radial interior width of the clamping groove may decrease in a direction opposite to the clip-on direction; expediently with the cone angle of the receptacle wall. The clamping groove will, in this way, produce a wedge effect until the bead finally settles in position.

[0018] In order to improve the holding effect for the clip-on lid at least one belt-like zone with an increased coefficient of friction ought to be provided at the outer surface of the outer leg wall and/or at the inner wall of the receptacle. This might result in an increased friction engagement between the lid and the receptacle and a stiff cup opening region.

[0019] The constriction may consist of successive deeper and shallower depressions formed from the exterior. Preferably, the deeper depressions are longer in circumferential direction than the shallower depressions. This facilitates the clip-on action but results in a stable and durable holding effect, and stiffens the lid periphery.

[0020] A plurality of upwardly protruding beverage dis-

tinguishing protrusions in the dome top wall may be provided to allow identification of the type of liquid from outside, e.g. coke, diet coke, orange juice, etc. The protrusions may be push-in buttons.

[0021] A penetration region may be formed in the dome top wall. This region may have a thinner wall thickness than at least the dome top wall, and has intersecting score lines through which a straw comfortably may be introduced by breaking the score lines. The reduced wall thickness allows to insert the straw more easily. The reduced wall thickness may be produced by locally compressing the material of the lid. The region with reduced wall thickness is particularly useful for a relatively stiff lid having a somewhat thicker wall than such conventional lids. Providing the thinner region, however, is of general advantage for all such lids, because this measure generally facilitates the introduction of a straw.

[0022] The penetration region for introducing a straw expediently is provided at the bottom of a recess e.g. located in the centre of the dome top wall. The reduced bottom wall thickness increases the rigidity of the dome in view to the easy clip-on action.

[0023] The penetration region may be curved inwardly to facilitate the introduction of a straw and to increase the resistance against buckling outwards by liquid pressure. The curvature also leads to an automatic closing effect of the broken score lines after the straw is withdrawn and when liquid pressure acts from inside on the flaps defined by the broken score lines. A contour of the recess corresponding to two ellipses the main axes of which are offset to each other by 90° increases the rigidity of the dome and offers an attractive appearance of the dome design. The score lines expediently are formed along the main axes of both ellipses. It might suffice to have only a thin walled core portion of the bottom instead to facilitate the introduction of a straw.

[0024] Expediently, the cone angle of the outer surface or the centring and guide projection either may be zero or has a value which is smaller than the angle value of the cone angle of the receptacle inner wall. The rigid centring and guide projection forces the bead into a leakage-proof seated condition in the clamping groove and even may cause a deformation of the opening area of the receptacle for intensified receptacle rim portion stiffening and sealing purposes. The lid may also to used with double wall receptacles.

[0025] The centring and guide projection, in this case, ought to be continued downwardly by an inward stepped portion of the outer leg wall dimensioned for a press-fit co-action with the receptacle wall. The inwardly stepped portion should have a cone angle essentially equal to the cone angle of the inner receptacle wall below the upper stepped opening area. The co-action between the stepped portion and the receptacle inner wall provides an intensified sealing effect even deep inside the receptacle.

[0026] Embodiments of the invention are explained making reference to the drawings, in which:

Fig. 1 is a side view of a lid,

Fig. 2 is a section along the axis of the lid of Fig. 1,

Fig. 3 is a section along the axis of a receptacle for which the lid of Fig. 1 and Fig. 2 is intended to be used,

Fig. 4 shows an enlarged sectional view of a phase during the clip-on operation of the lid onto the receptacle,

Fig. 5 shows a sectional view of a phase in which the lid has fully been clipped onto the receptacle,

Fig. 6 is an axial sectional view of a further embodiment of a lid,

Fig. 7 is a side view of a part of the lid of Fig. 6,

Fig. 8 is a part of a portion of the lid of Fig. 6, in a phase of the clip-on action of the lid in which the bead of the receptacle just has reached the constriction,

Fig. 9 is a view corresponding to Fig. 8, in a phase of the clip-on action, in which the clamping groove temporarily is opened somewhat during clipping-on of the lid,

Fig. 10 is a view corresponding to Fig. 8, in a phase in which the lid is clipped- on properly,

Fig. 11 is a plan view of the dome of the lid of Fig. 6,

Fig. 12 is an axial section in the centre of the dome of Fig. 11 in the section plane XII - XII,

Fig. 13 is an axial sectional view of a further embodiment of a lid,

Fig. 14 is a view of the lid of Fig. 13 from above,

Fig. 15 is a lid stack consisting of several lids of Figs 13 and 14,

Fig. 16 is an axial sectional view of a lid and a double wall receptacle in a preparatory phase of a clip-on action of the lid,

Fig. 17 is a sectional view similar to Fig. 16 with the lid fully clipped-on the double wall-receptacle, and

Fig. 18 is a sectional view similar to Fig. 5, of another embodiment.

[0027] A lid D, which is intended to be used for a cup-shaped receptacle C consisting of paper or paperboard or plastic material is e.g. drawn from elastic plastic foil material and has a wall thickness of e.g. 0.3 to 0.5 mm (Fig. 1). The lid is adapted to be clipped on an opening area 9 of the receptacle C such that said receptacle C is closed in a leakage-free manner and such that the lid D will not come off, not even if the full receptacle C falls over. The lid D (Fig. 1) is provided with a peripheral, circumferentially continuous clamping groove 1, above the plane of which a dome 2 vaults on the inner side of the clamping groove 1. The dome 2 is separated from the clamping groove 1 by a circumferential substantially uniform lid recess V and is provided with an essentially planar dome top wall 5 and several circumferentially distributed depressions 3. Relative to the clamping groove 1, an outer leg wall 4 of a lid recess V (Fig. 2) extends markedly downwards beyond the plane of the clamping groove 1 and also beyond an outer wall 16, 18 downwardly extending from a constriction 14.

[0028] The lid D (Fig. 2) is clipped onto the opening area 9 of the receptacle C (Fig. 3) by applying pressure R e.g. only on the dome top wall 5 in clip-on direction. The dome top wall 5 extends essentially parallel to the plane of the lid D. The lid recess V has a U-shaped cross-section and concentrically surrounds the dome 2. The lid recess V is bound by the outer leg wall 4, which in this embodiment tapers conically downwards, a lower U-web 22, and an inner leg wall 23 which forms an upwardly extending outer dome wall. The outer leg wall 4 has an outer surface 6 which extends into the clamping groove 1. The outer surface 6 is arranged at a conical angle $\alpha/2$, which may correspond at least essentially to the conical angle $\alpha/2$ of a receptacle wall 7 of the receptacle C.

[0029] At the lower end of the receptacle wall 7 in Fig. 3, a receptacle bottom 8 is arranged, whereas the opening area 9 of the receptacle is delimited by the receptacle wall 7 and an outwardly projecting bead 10, preferably a so-called curled rim 11 consisting of the paperboard or paper material of the receptacle C. In the case of a plastic receptacle, the bead 10 may also be produced by injection moulding. The bead instead may be only a half curled bead or an outwardly projecting receptacle rim flange.

[0030] Fig. 4 shows the lid D on the bead 10, which is formed as a curled rim 11. The constriction 14 of the lid D rests on the bead 10.

[0031] The outer leg wall 4 is continued, at the upper end by a wall 12 which extends approximately parallel to the plane of the lid and by a circumferential apron 13. The apron 13 extends approximately parallel to the axis of the lid D down to the constriction 14. The constriction 14 may be a score-like depression from the outside and forms an interior rounded crest 15. The crest 15 and the constriction 14 can be continuous in circumferential direction, or alternatively can be formed by individual local depressions between which (indicated by broken lines) the outer contour approximately continues. The constriction 14 is continued downwardly by an outwardly inclined wall 16 defining a clip-on ramp 17. From wall 16, a further apron 18 extends downwards, terminating at an exterior flange 19. The height of the further apron 18 could be shorter than shown. Outwardly inclined wall 16 and further apron 18 form the outer wall downwardly extending from the constriction 14.

[0032] The radial thickness Y of the bead 10, measured at the transition from the straight receptacle wall 7 to the curvature of the bead 10, may be larger than the radial interior width Y1 of the clamping groove 1. The radial thickness Y may exceed the interior width Y1 by 10% to 20%, preferably by approx. 15%. In the clamping groove 1 the radial interior width Y1 gradually decreases, preferably with the cone angle $\alpha/2$ from the constriction 14 towards the wall 12.

[0033] The clamping groove 1 defines a length L between the crest 15 and the inner side of the wall 12. The outer leg wall 4 extends downwards beyond the height position of the constriction 14 by a length L1 which may be equal to at least 2.5 times the height L, preferably 3 times, and even more preferably 4 times the height L or more.

[0034] The outer diameter D1 of the outer surface 6 of the outer leg wall 4 at the height position of the constriction 14 (e.g. the crest 15) at least largely corresponds to the interior diameter D7 of the receptacle wall 7 at the bead 10, i.e. at the transition from the straight receptacle wall 7 to the outwardly directed curvature of the bead 10. The outer diameter D2 of the outer surface 6 of the outer leg wall 4 at the junction with wall 12 may even be larger than the interior diameter D7.

[0035] When pressure R is applied on the dome 2 in Fig. 4 the outer surface 6 already slidingly contacts the receptacle wall 7 before or as soon as the bead 10 reaches the constriction 14. The lid recess V forms a centring and guide projection K which supports and facilitates the easy clip-on operation of the lid D. It will be expedient when the sliding contact is established even before the bead 10 reaches the constriction 14. When the lid D is pressed down still further, the bead 10 will deform the constriction 14 elastically outwards; in the course of this process, also the bead 10 is slightly deformed before it moves over the crest 15 and snaps into the clamping groove 1 (Fig. 5). The criss-cross hatched regions shown in Fig. 5 indicate squeezed areas 20, 21 formed in the bead 10 and the receptacle wall 7, to promote the sealing, the holding and the stiffening effects. Alternatively or additively, also the outer leg wall 4 may slightly yield inwards (indicated in broken lines at 21').

[0036] The lid D in Figs 6 to 10 differs from the lid D of Figs 1 to 5 by a modified design of the constriction 14 and by a recess 24 in the dome top wall 5. The constriction 14 (Fig. 7) is formed by alternating successive deeper and shallower depressions 16a, 16b. The depressions 16a, 16b form a snake line shaped inner crest 15'. The deeper depressions 16a may be longer in circumferential direction than the shallower depressions 16b. Furthermore, Fig. 7 shows by dotted line 19' a shortened apron

18.

[0037] In Fig. 6 the recess 24 has a bottom dome region 25 of limited size substantially parallel to and situated below the dome top wall 5. The wall thickness x of the lid D is substantially constant. Only the region 25 is thinner (thickness x 1), e.g. by compressing the material. The region 25 is situated in the centre of the dome top wall 5. For introducing a straw the region 25 is formed with crossing breakable score lines 26. Expediently, the region 25 may be curved towards the inner side of the dome 2.

[0038] The depressions 3 in the transition from the dome top wall 5 to the inner leg wall 23 increase the rigidity of the dome 2 and allow to grip the lid D by the finger tips, e.g. in order to more easily remove the lid D from a stack of lids, and to put the lid D on the receptacle C. The clip-on force R even may be applied via the depressions 3 on the dome. However, preferably the easy clip-on action may be carried out by pressing the palm of the hand on the even dome top wall 5.

[0039] In Fig. 6 the outer leg wall 4 may have at least one belt-like circumferential zone 30 in which the coefficient of friction is increased in order to achieve an intensified holding effect as soon as the lid D is clipped-on. The zone 30 may be situated higher than shown, or may be narrower or wider. A respective zone with an increased coefficient of friction also could be provided at the receptacle wall 7, either instead of zone 30 at the lid, or in co-action with the zone 30 provided at the lid D.

[0040] A circumferentially continuous hinge mechanism M is integrated into the lid D by the design and the shape of the dome 2 and the lid recess V. The hinge mechanism may assist in clipping-on the lid D, as particularly shown in Figs 6 to 10.

[0041] The hinge mechanism M of the lid D consists of the dome 2, the inner leg wall 23, the U-web 22, and the outer leg wall 4. The transitions of the outer leg wall 4 into U-web 22 and of U-web 22 into inner leg wall 23 define hinges 29. The inner leg wall 23 extends essentially parallel to the longitudinal axis of the lid, while the U-web 22 is planar and perpendicular to the lid axis. It is to be noted that due to the rigidity of the dome 2 and due to the smaller diameter of the inner leg wall 23 in relation to the bigger diameter of the outer leg wall 4, the outer leg wall will yield inwardly easier than the inner leg wall 23. This effect is used to temporarily open the clamping groove 1 and to achieve an easy lid clip-on action.

[0042] In Fig. 8 the lid D is put on the bead 10 of the receptacle C such that the entire circumferential extension of the constriction 14 will become is centred on the bead 10. The outer leg wall 4 contacts the receptacle wall 7. Now a clip-on force R is applied e.g. to the dome top wall 5, e.g. by the flat hand until the dome top wall 5 lowers (Fig. 9).

[0043] In Fig. 9 a reaction force R' acts counter to the clip-on force R, since the constriction 14 seats on the bead 10. The inner leg wall 23 tilts the U-web 22 downwards by the inner hinge 29 at the transition from the inner leg wall 23 into the U-web 22. Thanks to the radial rigidity of the dome 2 the tilting of the U-web 22 results in a force 28 acting at the outer hinge 29. The force 20 relieves the outer leg wall 4 from the receptacle wall 7 such that even the clamping groove 1 may open somewhat at the inner side. The apron 18 is displaced outwards in the direction of an arrow 27 by the reaction force R', such that even the clamping groove 1 temporarily may open somewhat at the outer side. Under the clip-on force R, and, because dome top wall 5 is lowered, by then possibly also pressing on the wall 12, the bead 10 slides past the constriction 14 until it finally snugly is clipped into the clamping groove 1.

[0044] In Fig. 10 the clip- on force R has ceased. The U-web 22 returned by elasticity into the orientation essentially perpendicular to the lid axis and presses the outer leg wall 4 against the receptacle wall 7. The apron 8 also returned by elasticity. The clamping groove 1 firmly holds the bead 10. The centring projection K and the clamping groove 1 both significantly stiffen the opening portion of the receptacle C.

[0045] In Fig. 11 the recess 24 has a wall contour like a quatrefoil, i.e. a contour which may be characterised by two equally sized ellipses the main axes of which are offset by 90°. The score lines 26, in the region 25 extend along the main axes of both ellipses. Fig. 12 shows the difference between the wall thickness x and the wall thickness X1 in region 25 in exaggerated scale. The region 25 may be curved inwardly, as shown, or may be parallel to the dome top wall 5. The reduced wall thickness x1 is not needed for the entire region 25. It could suffice to provide only a thin walled central portion of the region 25, e.g. by compressing the material when producing the lid D.

[0046] The radial width of the annular U-web 22 in Figs 6 to 10 may amount to about 10% of the outer diameter of the lid D, while the diameter of the dome top wall 5 may amount to about 60% of the outer diameter of the lid D.

[0047] The embodiment of the lid D of Figs 13 and 14 is similar to the embodiment of Figs 6 to 12 but additionally is provided with regularly distributed beverage distinguishing protrusions 5a in the dome top wall 5. There are, e.g., four oval beverage distinguishing protrusions 5a, each having a marking and/or a pushable button in its top. This is standard equipment of many lids on the market. The protrusions 5a are located with a small radial distance from the outer edge of the dome top wall 5 and also with a small radial distance from the central recess 24. Furthermore, the depressions 3 are made undercut such that they may be gripped more easily by the finger tips when the lid D has to be removed from a stack of several lids (as shown in Fig. 15). Each depression 3 may define a lateral shoulder 3a which may serve as a stacking stop as shown in Fig. 15 such that shoulder 3a rests on the dome top wall 5 of the next lid D of the stack. The shoulder 3a expediently prevents that the stacked lids get jammed within each other, because the stacked

lids contact each other mainly where the shoulders 3a rest on the dome top wall 5 and where the outer leg walls contact each other. This feature results in an orderly and dense stack from which each lid D can be removed comfortably. In the embodiment shown, eight depressions 3 are provided.

[0048] The lid D of Figs 13 to 15 also has the centring and guide projection K (a guide cone) and the hinge mechanism M for facilitating the clip-on action.

[0049] Figs 16 and 17 show an easy clip-on lid D for a double wall receptacle CD having some, but not all, the features of the invention. The double wall receptacle CD has an inner wall 7 and an outer wall 7c with an air gap in-between to provide a thermal insulating effect. The bead 10 is formed at the upper end of the inner wall 7. The double wall receptacle CD first is formed with a cone angle $\alpha/2$ which continues to the bead 10. During the forming process the upper part of the inner wall 7 is widened outwards such that the opening area 9a results where the cone angle $\alpha'/2$ is smaller than the cone angle $\alpha/2$, or even almost zero, and such that a shoulder 7b is formed. The lid D for the double wall receptacle CD has the already described centring and guide projection K. In this case the projection K is formed such that the outer surface 6 either is cylindrical (as shown) or has a small cone angle $\beta/2$ between 0° (cylindrical) or a value similar but smaller than the cone angle $\alpha'/2$. The outer surface 6 or the outer leg wall 4 is continued by an inwardly stepped wall portion 4b such that a shoulder 4a is formed. The outer surface portion 6a of wall portion 4b is inclined with cone angle $\alpha/2$. The bottom of the centring and guide projection K is formed by the U-web 22 which extends substantially perpendicular to the central lid axis. The diameter D1 of the outer surface 6 corresponds essentially to the diameter D7 of the opening area 9a in the region of the bead 10. In the opening area 9a inner parts of the inner receptacle wall 7a and outer parts of the outer leg wall 4 and the wall portion 4b are indicated to be deformed or to get into intimate pressure contact when the lid D is fully clipped-on the double wall receptacle CD, which may also be constructed without such shoulder 7b, wherein in such a case also the lid has no shoulder 4a.

[0050] In Fig. 16 the lid D is centred on the double wall receptacle CD such that the bead 10 has approached the constriction 14 from below. Then the outer surface 6 already contacts the inner receptacle wall 7a in the opening area 9a to properly centre and guide the lid D when the clip-on pressure R is applied e.g. on the dome top wall 5 (not shown in Fig. 16).

[0051] While the clip-on pressure forces the constriction 14 over the bead 10, the outer surface 6 is guiding the lid D. When the U-web 22 is tilted downwardly, as already explained above, the outer leg wall 4 is somewhat dislocated inwardly, while the constriction 14 yields outwardly. This facilitates that the constriction 14 easily slips over the bead 10 until the position of Fig. 17 is reached. The bead 10 then is gripped from the outer side and the inner side. The contacting wall parts (20 and 20') may become squeezed. The shoulder 4a either is seated on the shoulder 7b or at least is close to shoulder 7b. A particular contact pressure is achieved in the region 20' resulting in an additional sealing effect in addition to the sealing effect achieved by the co-action between the clamping groove 1 and the bead 10 and between the outer leg wall 4 and the inner receptacle wall portion 7a. In Fig. 17, the rigid dome structure of the lid D even may force the inner receptacle wall portion 7a into a parallel relationship to the outer leg wall 4 resulting in a high holding force and an excellent effect and a markedly stiffened opening portion of the closed receptacle CD.

[0052] Additionally, the co-action between the shoulders 4a, 7b may result in a clip-on limiting stop preventing that the bead will be deformed too much. The abutting shoulders 4a, 7b even may maintain the bead 10 and the clamping groove 1 in a preloaded closing condition characterised by high leakage-proofness and high holding force for the lid D.

[0053] Fig. 18 is a sectional view of clipped-on lid D on one-wall receptacle C, similar to Fig. 5. Bead 10 is fully curled inwards. Clamping groove 1 of the lid D is of round cross-section. The criss-cross hatched areas represent zones of strong contact, e.g. of even slightly squeezed surface portions. There is tight contact between the clamping groove 1 and the bead 10 over more than 180° of the circumference of the bead 10. The outer leg wall 4 significantly stiffens the upper opening region against radial deformation.

Claims

1. A plastic material clip-on lid (D) and a cup-shaped receptacle (C), especially of paper or cardboard with an opening area (9) being delimited by an upwardly and outwardly tapering conical receptacle wall (7) and an outwardly projecting bead (10), especially a curled rim (11), the lid (D) being formed with a peripheral clamping groove (1) which is open on the lower surface of the lid for receiving therein the bead (10), the clamping groove (1) having at the outer lower end region an elastically expandable constriction (14) and at the inner side a conical outer surface (6) of an outer leg wall (4) of a circumferentially extending lid recess (V) of U-shaped cross-section, a U-web (22) of the lid recess (V) being located below the height position of the constriction (14), the inner leg wall (23) of the lid recess (V) being part of a dome wall of a dome (2) having a dome top wall (5) wherein the lid recess (V) is formed with such a depth to extend downwards beyond the height position of the constriction (14), preferably also beyond an outer wall (16,18) extending from the constriction (14), and has an outer diameter (D1) at the outer surface (6) at the elevation of the constriction (14) adapted to the inner diameter (D7) of the receptacle wall (7) at

the bead (10) such that during an easy clip-on operation of the lid (D) the lid recess (V) outer surface (6) functions as a lid centring and guide projection (K) co-operating by sliding contact with the receptacle wall (7) at least while the bead (10) moves past the constriction (14) into the clamping groove (1), when downwardly directed clip-on pressure (R) mainly is applied to the dome (2) **characterised in that** in the clamping groove (1) the outer diameter (D2) of the outer surface (6) is larger than the interior diameter (D7) of the receptacle wall (7) in the opening area (9).

2. Lid and receptacle according to claim 1, **characterised in that** the dome (2) and the lid recess (V) commonly constitute an integral, circumferentially continuous hinge mechanism (M) for temporarily opening the clamping groove (1) by dislocating the outer leg wall (4) inwards while the constriction (14) is resting under pressure (R) on the bead (10).

3. Lid and receptacle according to claim 1 or 2, **characterised in that** the U-web (22) is substantially planar and essentially perpendicular to the lid axis, and that inner leg wall (23) extends substantially parallel to the lid axis.

4. Lid and receptacle according to one of the claims 1-3, **characterised in that** the centring and guide projection (K) is formed such that it co-operates by sliding contact with the receptacle wall (7) already before the bead (10) reaches the constriction (14) from the lower side.

5. Lid and receptacle according to one of the claims 1-4, **characterised in that** the outer diameter (D1) of the outer surface (6) corresponds, on a level substantially at the height position of the constriction (14), at least to the inner diameter (D7) of the receptacle wall (7) in the opening area (9), and that the cone angles ($\alpha/2$) of the receptacle wall (7) and of the conical outer surface (6) are at least approximately equal.

6. Lid and receptacle according to one of the previous claims, **characterised in that** the outer surface (6) extends downwards beyond the height position of the constriction (14) by a length (L1) which is equal to at least 2.5 times the height (L) of the clamping groove (1), and in particular the outer surface (6) extends downwards beyond the height position of the constriction (14) by at least a length (L1) which is equal to 3 times the inner height (L), preferably even 4 times or more of the height (L) of the clamping groove (1).

7. Lid and receptacle according to one of the previous claims, **characterised in that** the cone angle ($\alpha/2$) lie between approx. 6° and 12°, preferably between approx. 8° and 10°.

8. Lid and receptacle according to one of the previous claims, **characterised in that** the dome (2) has circumferentially distributed depressions (3), preferably four or eight regularly distributed depressions (3) of identical size and identical depth, at the transition between the dome top wall (5), and the upwardly extending inner leg wall (23).

9. Lid and receptacle according to one of the previous claims, **characterised in that** each depression (3) defines an undercut finger grip indent in the inner leg wall (23) and/or each depression (3) is formed with a lower shoulder (3a) defining a lid stacking stop.

10. Lid and receptacle according to claim 1, **characterised in that** at least one belt-like, circumferential zone (30) is provided at the outer surface (6) of said outer leg wall (4) and/or the receptacle wall (7), said zone (30) having an increased coefficient of friction compared to the vicinity of said zone (30).

11. Lid and receptacle according to one of the previous claims, **characterised in that** the radial thickness (Y) of the bead (10) exceeds the radial interior width (Y1) of the clamping groove (1) and in particular the radial thickness (Y) of the bead (10) exceeds the average radial interior width (Y1) of the clamping groove (1) by approx. 10% to 20%, preferably by approx. 15%.

12. Lid and receptacle according to claim 11, **characterised in that** the radial interior width (Y1) of the clamping groove (1) decreases in a direction opposite to the clip-on direction from the constriction (14) onwards.

13. Lid and receptacle according to one of the previous claims, **characterised by** a plurality of regularly distributed upwardly protruding beverage distinguishing protrusions (5a) in the dome top wall (5).

14. Lid and receptacle according to one of the previous claims, **characterised in that** a penetration region (25) of predetermined size is formed in the dome top wall (5), the penetration region (25) thinner wall thickness (x1) than at least the dome top wall thickness (x), and that the penetration region (25) is formed with crossing score lines (26) for introducing a straw and/or the penetration region (25) is provided at a thin walled bottom of a recess (24) formed in the dome top wall (5), the bottom being situated below the dome top wall (5) and thin bottom wall thickness (x1) being made by local material compression.

15. Lid and receptacle according to one of the previous claims **characterised in that** the lid centring and

guide projection (K) and the clipped-on clamping groove (1) commonly define an annular receptacle opening area stiffening structure for preventing radial receptacle opening are deformations.

16. Lid and receptacle according to one of the previous claims, **characterized in that** the dome top wall (5) is located above the constriction and the clamping groove.

Patentansprüche

1. Aufsteckbarer Deckel (D) aus Kunststoffmaterial und becherförmiger Behälter (C), insbesondere aus Papier oder Pappe, mit einem Öffnungsgebiet (9), welches durch eine nach außen und nach oben konisch verlaufende Behälterwand (7) und einen nach außen vorstehenden Wulst (10), insbesondere in Form eines eingerollten Randes (11), begrenzt ist, wobei der Deckel (D) mit einer Umfangsklemmnut (1) versehen ist, die an einer Unterseite des Deckels zur Aufnahme der Wulst (10) offen ist, wobei die Klemmnut (1) an ihrem äußeren unteren Endbereich eine elastisch dehnbare Einschnürung (14), und an ihrer Innenseite eine konische Außenfläche (6) einer Aussenschenkelwand (4) einer sich in Umfangsrichtung erstreckenden Deckelausnehmung (V) mit U-förmigen Querschnitt aufweist, ein U-Steg (22) der Deckelausnehmung (V) unterhalb der Höhenposition der Einschnürung (14) angeordnet ist, die Innenschenkelwand (23) der Deckelausnehmung (V) Teil einer Kuppelwand einer Kuppel (2) mit einer oberen Kuppelwand (5) ist, wobei die Deckelausnehmung (V) mit einer derartigen Tiefe ausgebildet ist, dass sie sich nach unten über die Höhenposition der Einschnürung (14) und vorzugsweise auch über eine Außenwand (16, 18), welche von der Einschnürung (14) absteht, erstreckt, und einen Außendurchmesser (D1) an der äußeren Oberfläche (6) in Höhenposition der Einschnürung (14) aufweist, der an den inneren Durchmesser (D7) der Behälterwand (7) an der Wulst (10) so angepasst ist, dass während eines einfachen Aufsteckvorgangs des Deckels (D) die äußere Oberfläche (6) der Deckelausnehmung (V) als Zentrier- und Führungsvorsprung (K) für den Deckel in Zusammenwirkung mit einem Gleitkontakt mit der Behälterwand (7) wirkt, zumindest während der Wulst (10) sich entlang der Einschnürung (14) in die Klemmnut (1) bewegt, wenn ein nach unten gerichteter Aufsteckdruck (R) hauptsächlich auf dem Dom (2) ausgeübt wird, **dadurch gekennzeichnet, dass** in der Klemmnut (1) der äußere Durchmesser (D2) der äußeren Oberflächen (6) größer als der innere Durchmesser (D7) der Behälterwand (7) im Öffnungsgebiet (9) ist.

2. Deckel und Behälter nach Anspruch 1, **dadurch gekennzeichnet, dass** die Kuppel (2) und die Dekkelausnehmung (V) zusammen einen integralen, in Umfangsrichtung kontinuierlichen Scharniermechanismus (M) zum vorübergehenden Öffnen der Klemmnut (1) durch Verschieben der Aussenschenkelwand (4) nach innen bilden, während die Einschnürung (14) unter dem Druck (R) an der Wulst (10) ruht.

3. Deckel und Behälter nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der U-Abschnitt (22) im Wesentlichen planar und im Wesentlichen senkrecht zur Deckelachse ist und dass sich die Innenschenkelwand (23) im Wesentlichen parallel zur Deckelachse erstreckt.

4. Deckel und Behälter nach einem der vorangehenden Ansprüche 1-3, **dadurch gekennzeichnet, dass** der Zentrier- und Führungsvorsprung (K) derart ausgebildet ist, dass er durch einen Gleitkontakt mit der Behälterwand (7) bereits vor Erreichen der Einschnürung (14) seitens der Wulst (10) von der unteren Seite her zusammenwirkt.

5. Deckel und Behälter nach einem der vorangehenden Ansprüche 1-4, **dadurch gekennzeichnet, dass** der äußere Durchmesser (D1) der äußeren Oberfläche (6) auf einem Niveau im Wesentlichen an der Höhenposition der Einschnürung (14) wenigstens dem inneren Durchmesser (D7) der Behälterwand (7) in dem Öffnungsgebiet (9) entspricht und dass die Konuswinkel ($\alpha/2$) der Behälterwand (7) und der konischen äußeren Oberfläche (6) im Wesentlichen annähernd gleich sind.

6. Deckel und Behälter nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** sich die äußere Oberfläche (6) nach unten über die Höhenposition der Einschnürung (14) um eine Länge (L1) hinaus erstreckt, die wenigstens gleich dem 2,5-Fachen der Höhe (L) der Klemmnut (1) ist, und insbesondere sich die äußere Oberfläche (6) nach unten über die Höhenposition der Einschnürung (14) um wenigstens eine Länge (L1) hinaus erstreckt, die gleich dem Dreifachen der inneren Höhe (L), vorzugsweise sogar dem Vierfachen oder mehr der Höhe (L) der Klemmnut (1) ist.

7. Deckel und Behälter nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** der Konuswinkel ($\alpha/2$) zwischen annähernd 6° und 12°, vorzugsweise zwischen annähernd 8° und 10° liegt.

8. Deckel und Behälter nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Kuppel (2) in Umfangsrichtung verteilte Vertiefungen (3) und vorzugsweise vier oder acht regel-

mäßig verteilte Vertiefungen (3) identischer Größe und identischer Tiefe am Übergang zwischen der kuppeleigenen oberen Wand (5) und der sich nach oben erstreckenden Innenschenkelwand (23) aufweist.

9. Deckel und Behälter nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** jede Vertiefung (3) eine freigearbeitete Fingergreifeinbuchtung in der Innenschenkelwand (23) festlegt und/oder jede Vertiefung (3) mit einer einen Deckelstapelanschlag festlegenden unteren Schulter (3a) ausgebildet ist.

10. Deckel und Behälter nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** wenigstens eine bandartige Umfangszone (30) an der äußeren Oberfläche (6) der Aussenschenkelwand (4) und/oder der Behälterwand (7) vorgesehen ist, wobei die Zone (30) einen vergrößerten Reibungskoeffizienten im Vergleich zur Umgebung der Zone (30) aufweist.

11. Deckel und Behälter nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die radiale Breite (Y) der Wulst (10) die radiale innere Breite (Y1) der Klemmnut (1) übersteigt und insbesondere die radiale Dicke (Y) der Wulst (10) die durchschnittliche radiale innere Breite (Y1) der Klemmnut (1) um annähernd 10% bis 20%, vorzugsweise um annähernd 15% übersteigt.

12. Deckel und Behälter nach Anspruch 11, **dadurch gekennzeichnet, dass** die radiale innere Breite (Y1) der Klemmnut (1) in einer Richtung entgegengesetzt zur Aufsteckrichtung ab der Einschnürung (14) abnimmt.

13. Deckel und Behälter nach einem der vorangehenden Ansprüchen, **gekennzeichnet durch** eine Mehrzahl von regelmäßig verteilten, nach oben vorstehenden Getränkeunterscheidungsvorsprüngen (5a) in der kuppeleigenen oberen Wand (5).

14. Deckel und Behälter nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** ein Durchdringungsbereich (25) vorbestimmter Größe in der kuppeleigenen oberen Wand (5) ausgebildet ist, wobei der Durchdringungsbereich (25) eine geringere Wanddicke (x1) als wenigstens die Dicke (x) der kuppeleigenen oberen Wand aufweist, und dass der Durchdringungsbereich (25) mit sich kreuzenden Kerblinien (26) zum Einführen eines Strohhalmes ausgebildet ist und/oder der Durchdringungsbereich (25) an einem dünnwandigen Boden einer Ausnehmung (24) vorgesehen ist, die in der kuppeleigenen oberen Wand (5) ausgebildet ist, wobei der Boden unter der kuppeleigenen oberen Wand (5) gelegen ist und die geringe Bodenwanddicke (x1) durch eine örtliche Materialkompression bewirkt wird.

15. Deckel und Behälter nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** der Deckelzentrier- und Führungsvorsprung (K) und die aufgesteckte Klemmnut (1) zusammen eine ringförmige Versteifungsstruktur des Behälteröffnungsgebietes zur Verhinderung von radialen Behälteröffnungsverformungen bilden.

16. Deckel und Behälter nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die kuppeleigene obere Wand (5) oberhalb der Einschnürung und der Klemmnut angeordnet ist.

Revendications

1. Couvercle à emboîter par pression en matériau plastique (D) et réceptacle en forme de tasse (C), en particulier en papier ou en carton, avec une zone d'ouverture (9) délimitée par une paroi de réceptacle conique (7) évasée vers le haut et vers l'extérieur ainsi qu'un bourrelet projeté vers l'extérieur (10), en particulier un bord recourbé (11), le couvercle (D) étant formé avec une rainure d'emboîtement périphérique (1) qui est ouverte sur la surface inférieure du couvercle pour y recevoir le bourrelet (10), la rainure d'emboîtement (1) comportant dans la région terminale inférieure externe un rétrécissement élastiquement extensible (14) et sur le côté interne une surface externe conique (6) d'une paroi de pied externe (4) d'un logement de couvercle à extension circonférentielle (V) à section transversale en U, un flasque en U (22) du logement de couvercle (V) étant agencé sous la position en hauteur du rétrécissement (14), la paroi de pied interne (23) du logement de couvercle (V) faisant partie d'une paroi d'une coupelle (2) qui comporte une paroi supérieure de la coupelle (5) dans laquelle le logement de couvercle (V) est formé avec une profondeur telle qu'il s'étend vers le bas au-delà de la position en hauteur du rétrécissement (14), de préférence aussi au-delà d'une paroi externe (16, 18) qui s'étend à partir du rétrécissement (14), et comporte un diamètre externe (D1) à la surface externe (6) à hauteur du rétrécissement (14), adapté au diamètre interne (D7) de la paroi de réceptacle (7) au bourrelet (10), de telle sorte que durant une opération d'emboîtement par pression facile du couvercle (D), la surface externe (6) du logement de couvercle (V) fonctionne comme une projection de centrage et de guidage du couvercle (K) qui interagit par contact glissant avec la paroi de réceptacle (7) au moins pendant que le bourrelet (10) se déplace au-delà du rétrécissement (14) dans la rainure d'emboîtement (1), lorsqu'une pression

d'emboîtement par pression dirigée vers le bas (R) est principalement appliquée à la coupelle, **caractérisés en ce que**, dans la rainure d'emboîtement (1), le diamètre externe (D2) de la surface externe (6) est supérieur au diamètre interne (D7) de la paroi de réceptacle (7) dans la zone d'ouverture (9).

2. Couvercle et réceptacle selon la revendication 1, **caractérisés en ce que** la coupelle (2) et le logement de couvercle (V) constituent généralement un mécanisme de charnière intégral continu sur la circonférence (M) pour ouvrir temporairement la rainure d'emboîtement (1) en disloquant la paroi de pied externe (4) vers l'intérieur pendant que le rétrécissement (14) est appuyé sous pression (R) sur le bourrelet (10).

3. Couvercle et réceptacle selon la revendication 1 ou 2, **caractérisés en ce que** le flasque en U (22) est sensiblement plan et essentiellement perpendiculaire à l'axe du couvercle, et **en ce que** la paroi de pied interne (23) s'étend sensiblement parallèlement à l'axe du couvercle.

4. Couvercle et réceptacle selon l'une des revendications 1 à 3, **caractérisés en ce que** la projection de centrage et de guidage (K) est conformée de telle façon qu'elle interagit par contact glissant avec la paroi de réceptacle (7) déjà avant que le bourrelet (10) n'atteigne le rétrécissement (14) par le côté inférieur.

5. Couvercle et réceptacle selon l'une des revendications 1 à 4, **caractérisés en ce que** le diamètre externe (D1) de la surface externe (6) correspond, à un niveau correspondant sensiblement à la position en hauteur du rétrécissement (14), au moins au diamètre interne (D7) de la paroi de réceptacle (7) dans la zone d'ouverture (9), et **en ce que** les angles de cône ($\alpha/2$) de la paroi de réceptacle (7) et de la surface externe conique (6) sont au moins approximativement égaux.

6. Couvercle et réceptacle selon l'une des revendications précédentes, **caractérisés en ce que** la surface externe (6) s'étend vers le bas au-delà de la position en hauteur du rétrécissement (14) sur une longueur (L1) égale à au moins 2,5 fois la hauteur (L) de la rainure d'emboîtement (1), et en particulier **en ce que** la surface externe (6) s'étend vers le bas au-delà de la position en hauteur du rétrécissement (14) sur une longueur (L1) égale à au moins 3 fois la hauteur interne (L), et de préférence même 4 fois ou plus la hauteur (L) de la rainure d'emboîtement (1).

7. Couvercle et réceptacle selon l'une des revendications précédentes, **caractérisés en ce que** les angles de cône ($\alpha/2$) sont compris entre environ 6° et 12°, et de préférence entre environ 8° et 10°.

8. Couvercle et réceptacle selon l'une des revendications précédentes, **caractérisés en ce que** la coupelle (2) comporte des dépressions distribuées sur la circonférence (3), de préférence quatre ou huit dépressions distribuées régulièrement (3) de taille et profondeur identiques, à la transition entre la paroi supérieure de la coupelle (5) et la paroi de pied interne (23) qui s'étend vers le haut.

9. Couvercle et réceptacle selon l'une des revendications précédentes, **caractérisés en ce que** chaque dépression (3) définit une indentation de saisie de doigt en dégagement dans la paroi de pied interne (23) et/ou chaque dépression (3) est formée avec un épaulement inférieur (3a) qui définit un arrêt d'empilement de couvercle.

10. Couvercle et réceptacle selon la revendication 1, **caractérisés en ce qu'**au moins une zone circonférentielle en forme de ceinture (30) est pourvue sur la surface externe (6) de ladite paroi de pied externe (4) et/ou sur la paroi de réceptacle (7), ladite zone (30) présentant un coefficient de friction plus élevé qu'à proximité de ladite zone (30).

11. Couvercle et réceptacle selon l'une des revendications précédentes, **caractérisés en ce que** l'épaisseur radiale (Y) du bourrelet (10) dépasse la largeur radiale intérieure (Y1) de la rainure d'emboîtement (1) et en particulier **en ce que** l'épaisseur radiale (Y) du bourrelet (10) dépasse la largeur radiale intérieure moyenne (Y1) de la rainure d'emboîtement (1) d'environ 10 % à 20 %, et de préférence d'environ 15 %.

12. Couvercle et réceptacle selon la revendication 11, **caractérisés en ce que** la largeur radiale intérieure (Y1) de la rainure d'emboîtement (1) décroît en direction opposée à la direction d'emboîtement par pression à partir du rétrécissement (14).

13. Couvercle et réceptacle selon l'une des revendications précédentes, **caractérisés par** une pluralité de protubérances de distinction de boisson (5a) pointant vers le haut et régulièrement distribuées dans la paroi supérieure de la coupelle (5).

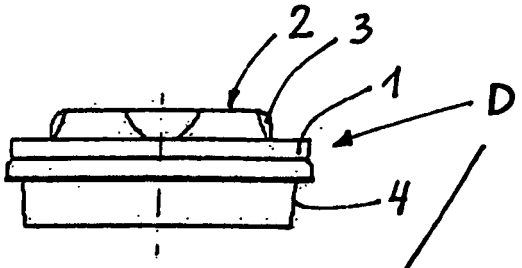
14. Couvercle et réceptacle selon l'une des revendications précédentes, **caractérisés en ce qu'**une région de pénétration (25) de taille déterminée est formée dans la paroi supérieure de la coupelle (5), **en ce que** l'épaisseur de paroi (x1) de la région de pénétration (25) est au moins inférieure à l'épaisseur de la paroi supérieure de la coupelle (x), et **en ce que** la région de pénétration (25) est formée par des

lignes d'incision croisées (26) pour introduire une paille, et/ou **en ce que** la région de pénétration (25) est pourvue d'une cavité (24) avec un fond à paroi mince, formée dans la paroi supérieure de la coupelle (5), le fond étant situé en dessous de la paroi supérieure de la coupelle (5) et la faible épaisseur de la paroi du fond (x1) étant obtenue par compression locale du matériau.

15. Couvercle et réceptacle selon l'une des revendications précédentes, **caractérisés en ce que** la projection de centrage et de guidage du couvercle (K) et la rainure d'emboîtement par pression (1) définissent en général une structure de raidissement de la zone annulaire d'ouverture du réceptacle pour éviter une ouverture radiale du réceptacle lors de déformations.

16. Couvercle et réceptacle selon l'une des revendications précédentes, **caractérisés en ce que** la paroi supérieure de la coupelle (5) est située au-dessus du rétrécissement et de la rainure d'emboîtement.

FIG 1



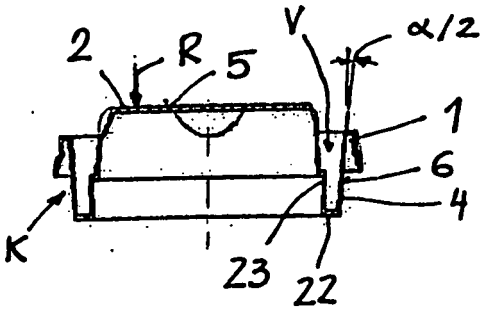


FIG 2

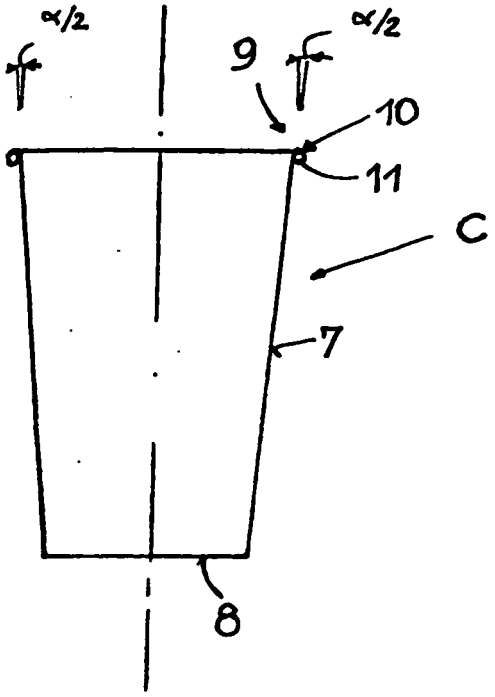


FIG 3

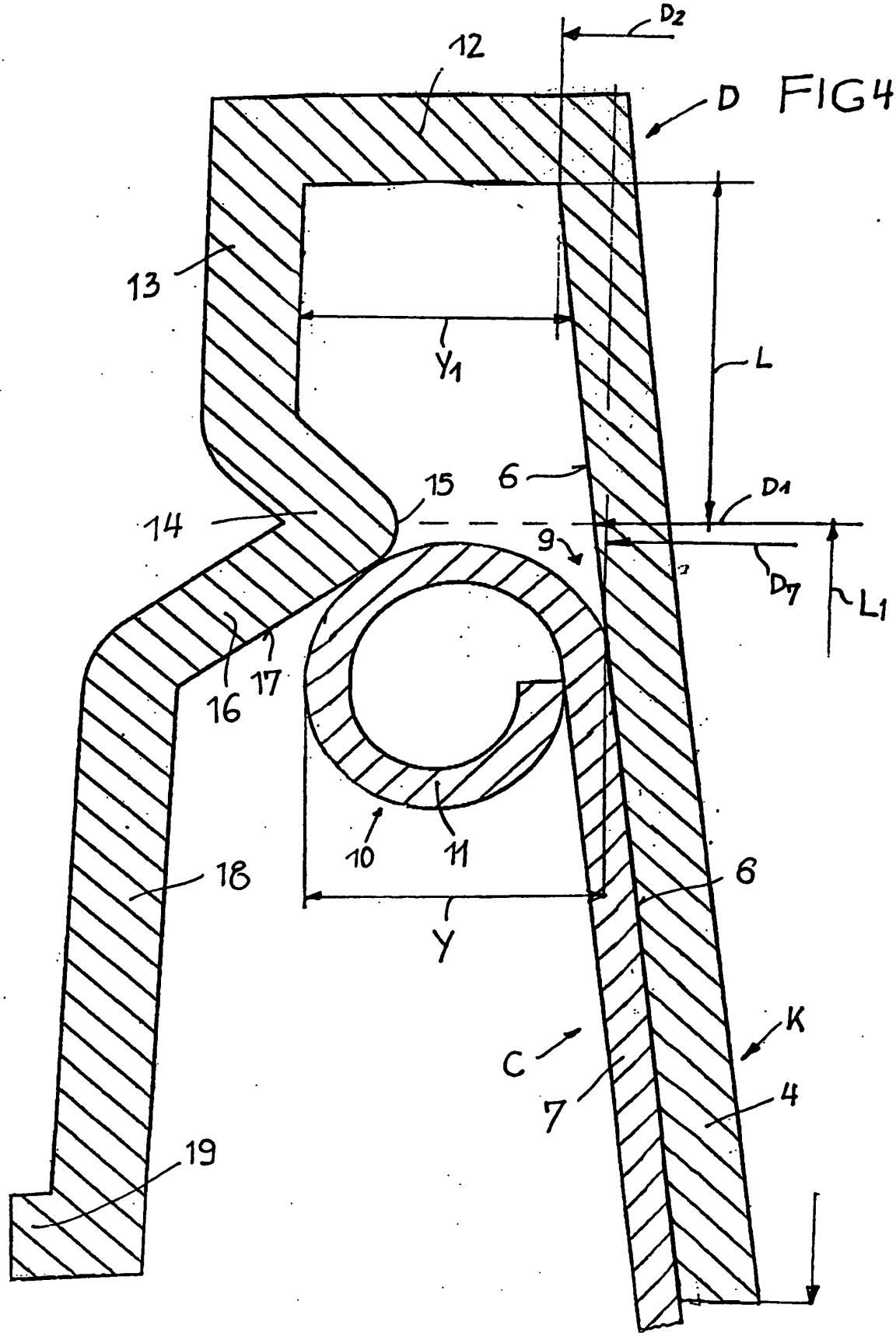


FIG4

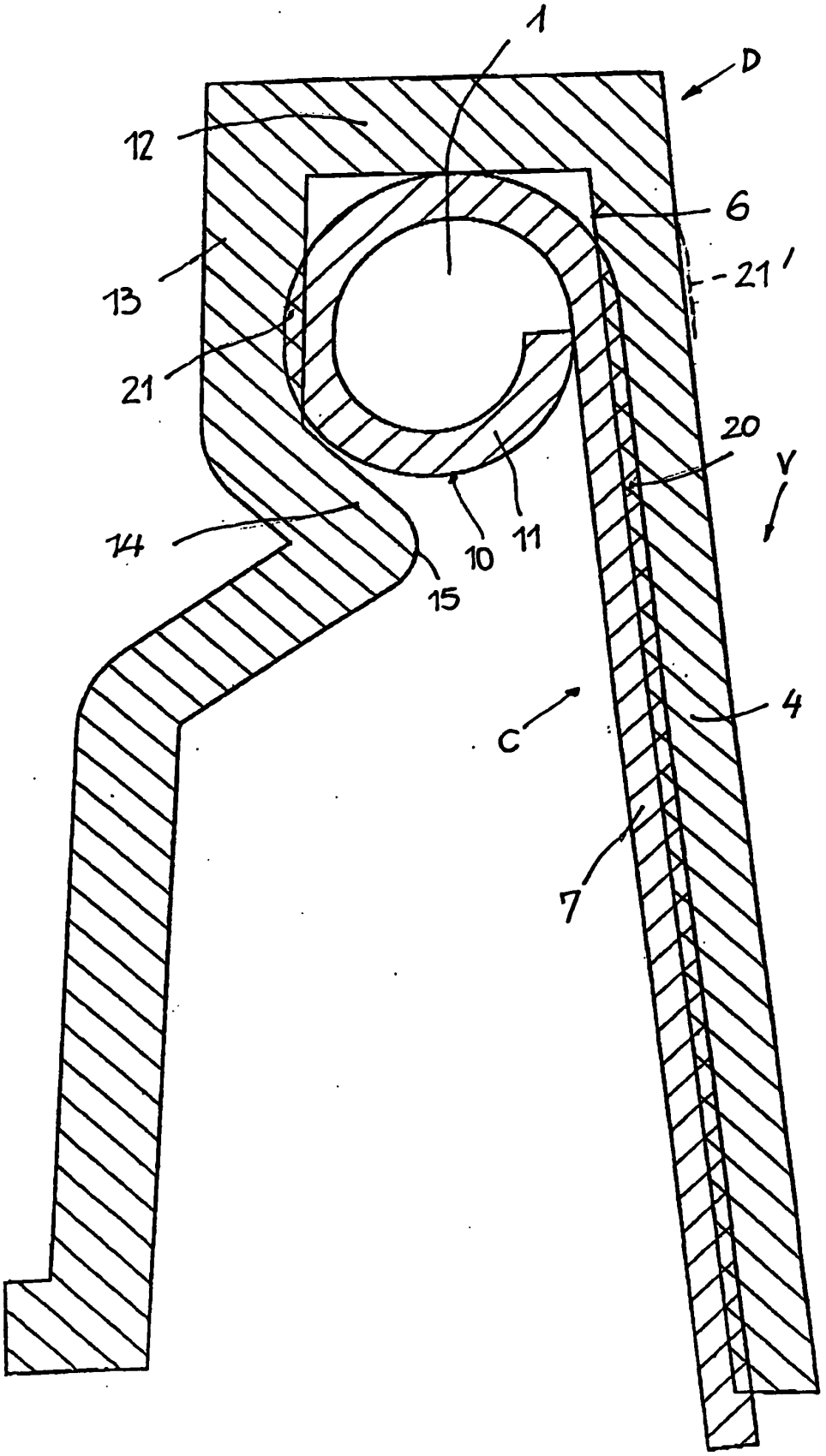


FIG5

FIG 6

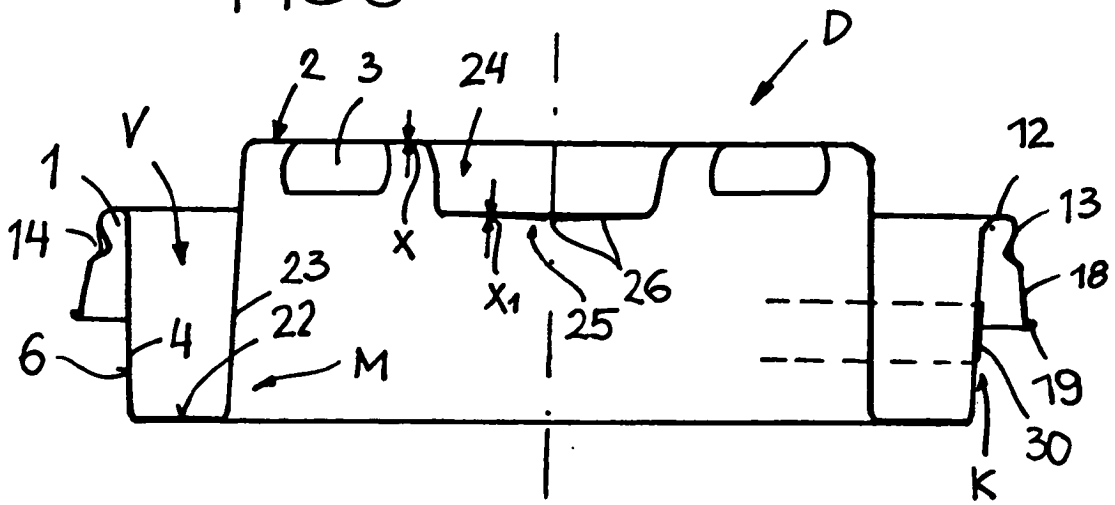
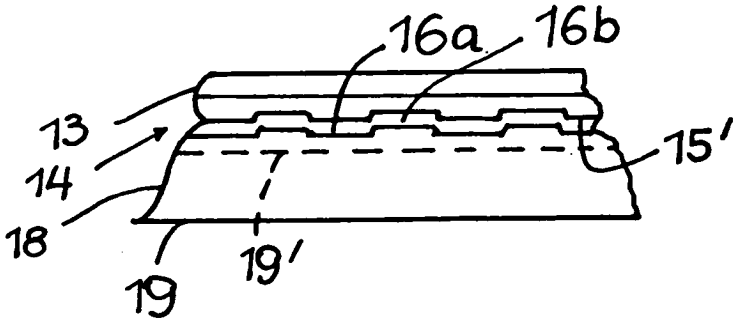


FIG 7



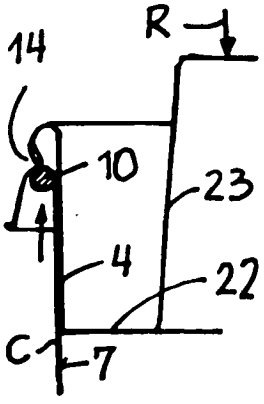


FIG 8

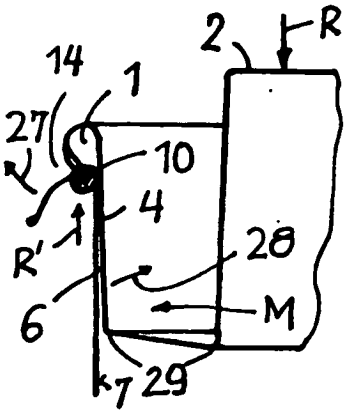


FIG 9

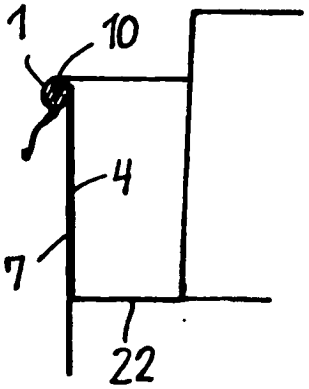


FIG 10

FIG 11

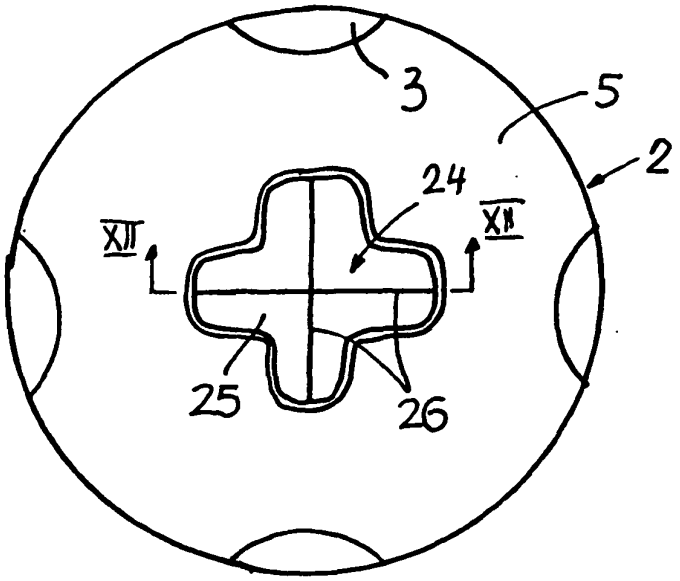


FIG 12

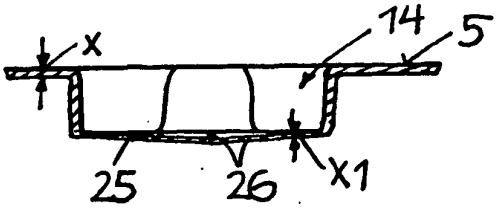


FIG 18

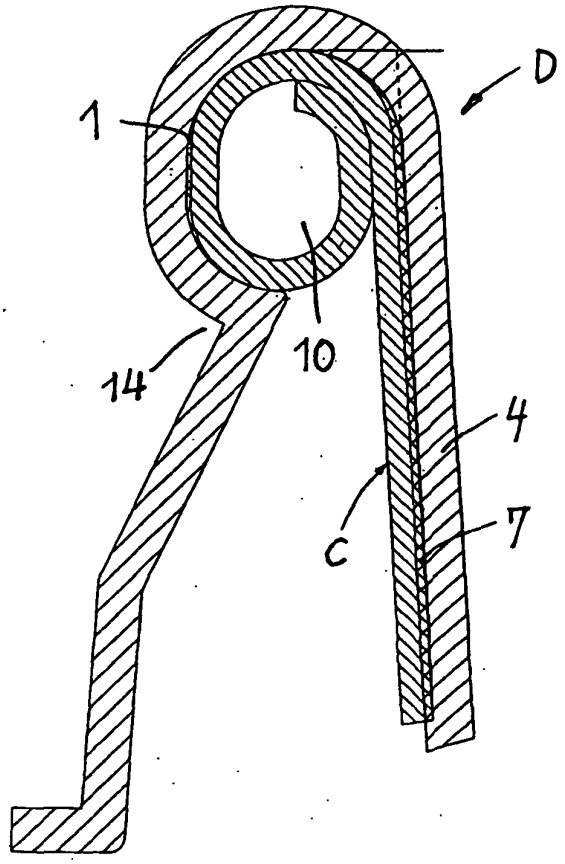


FIG 13

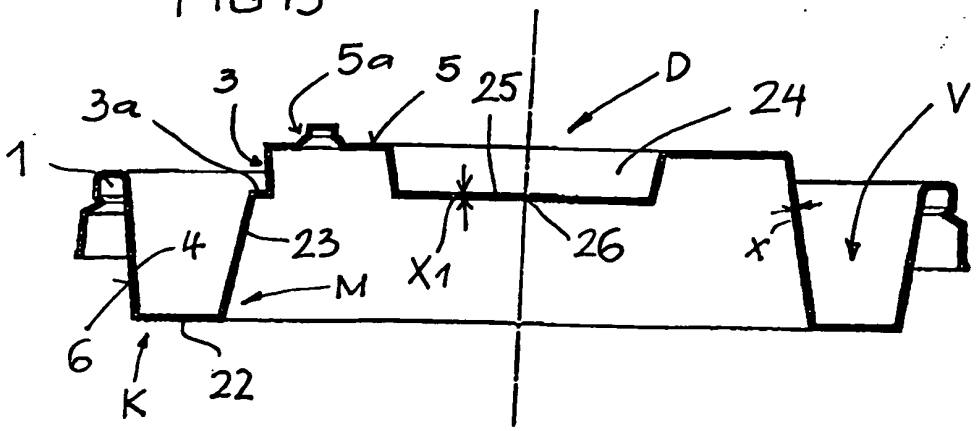


FIG 14

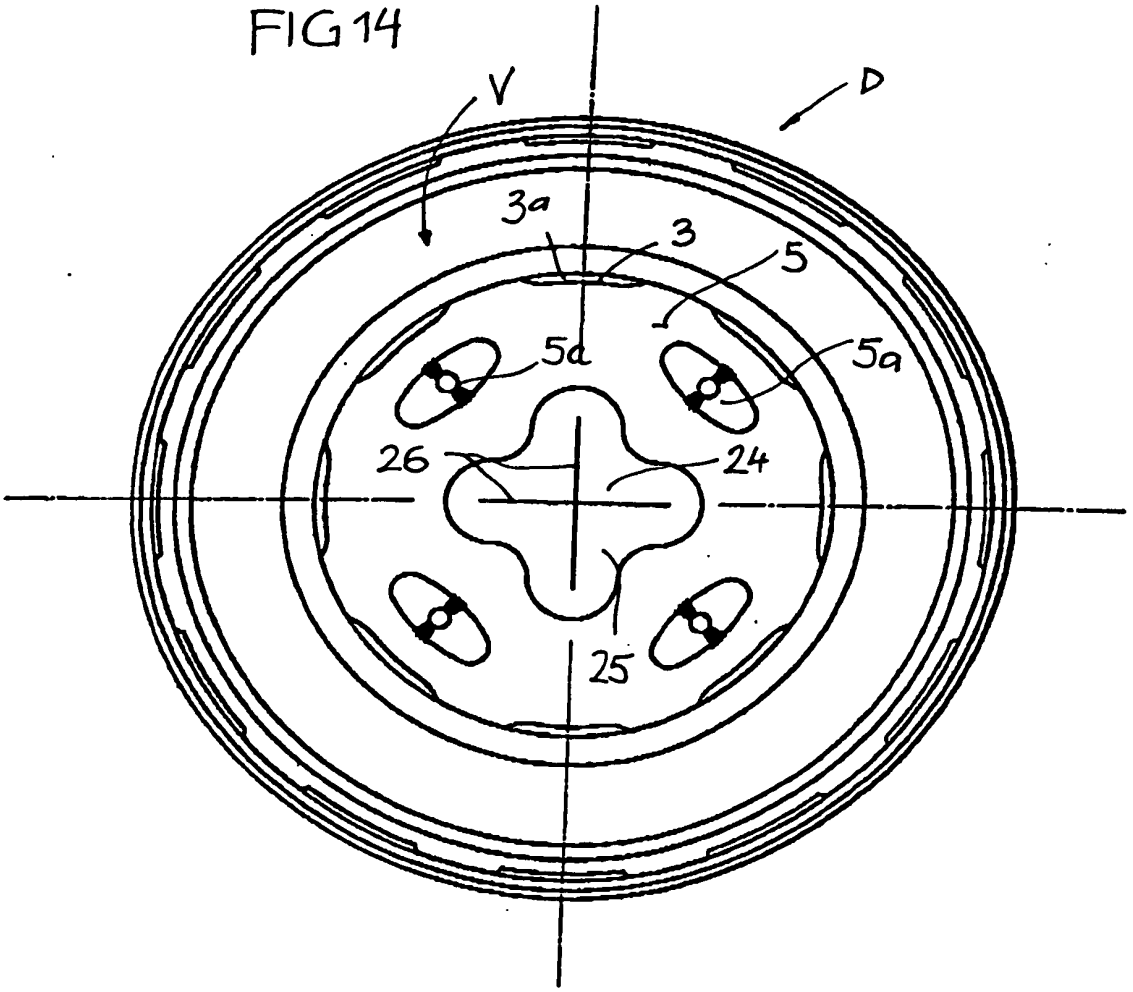


FIG 15

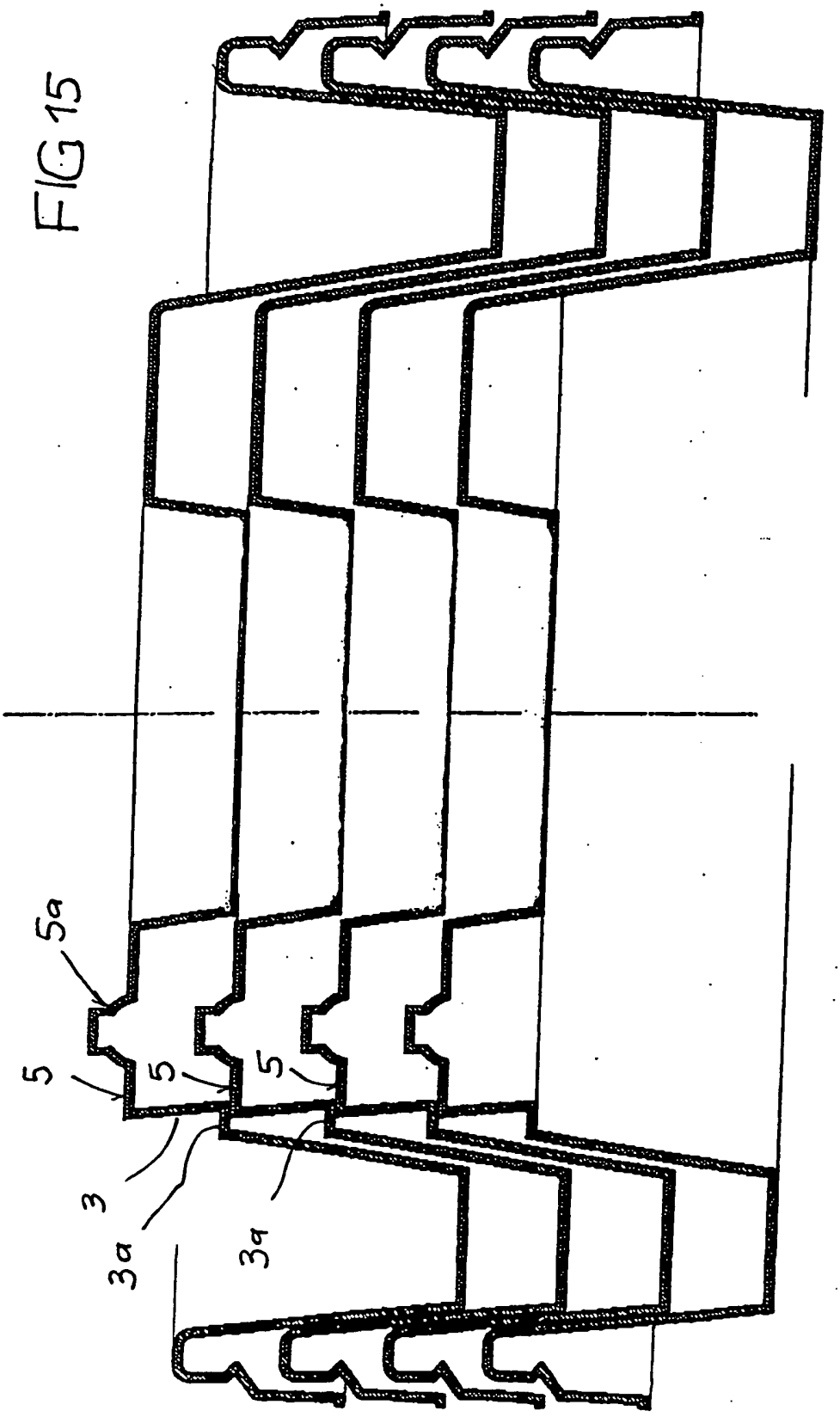


FIG 16

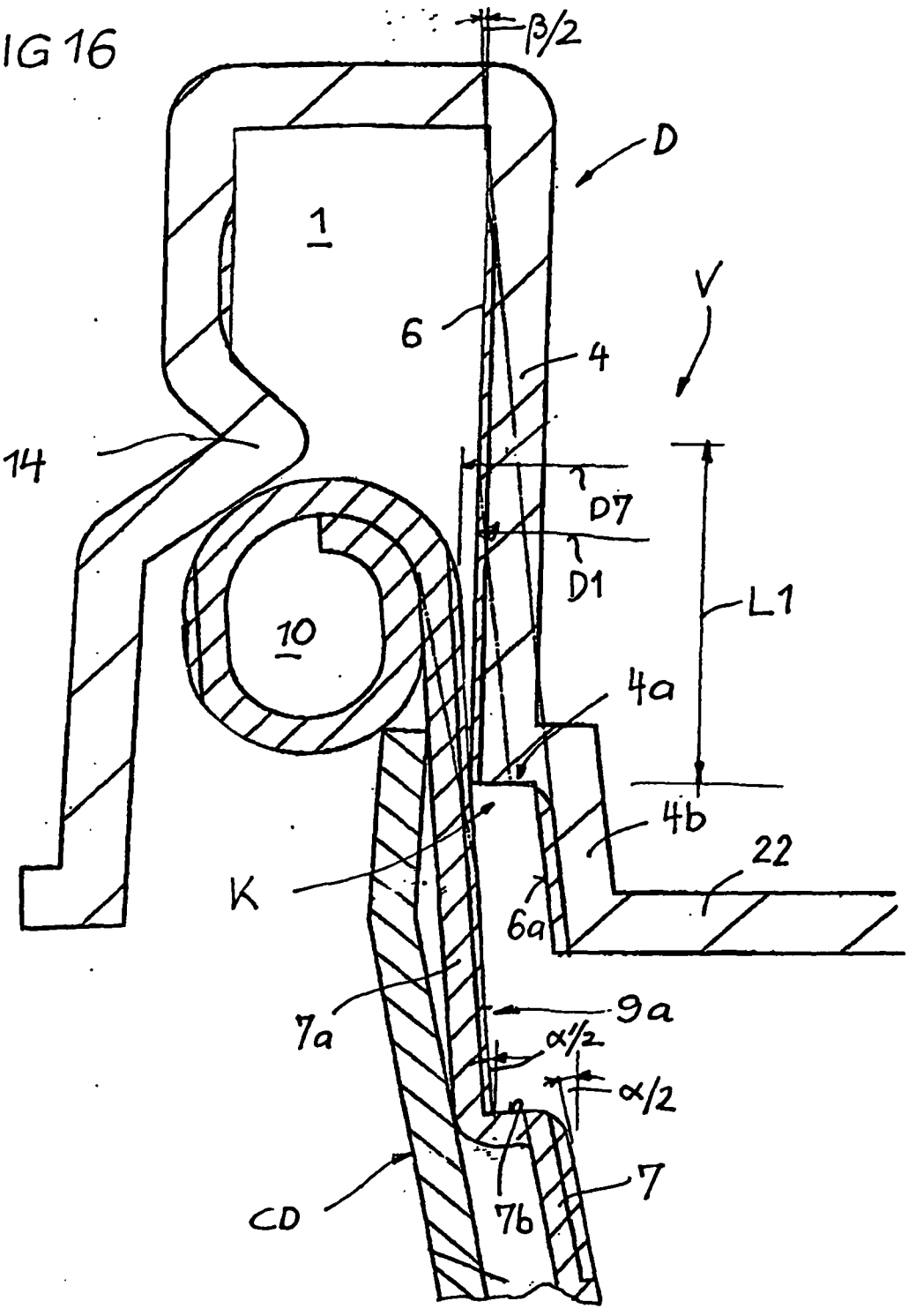
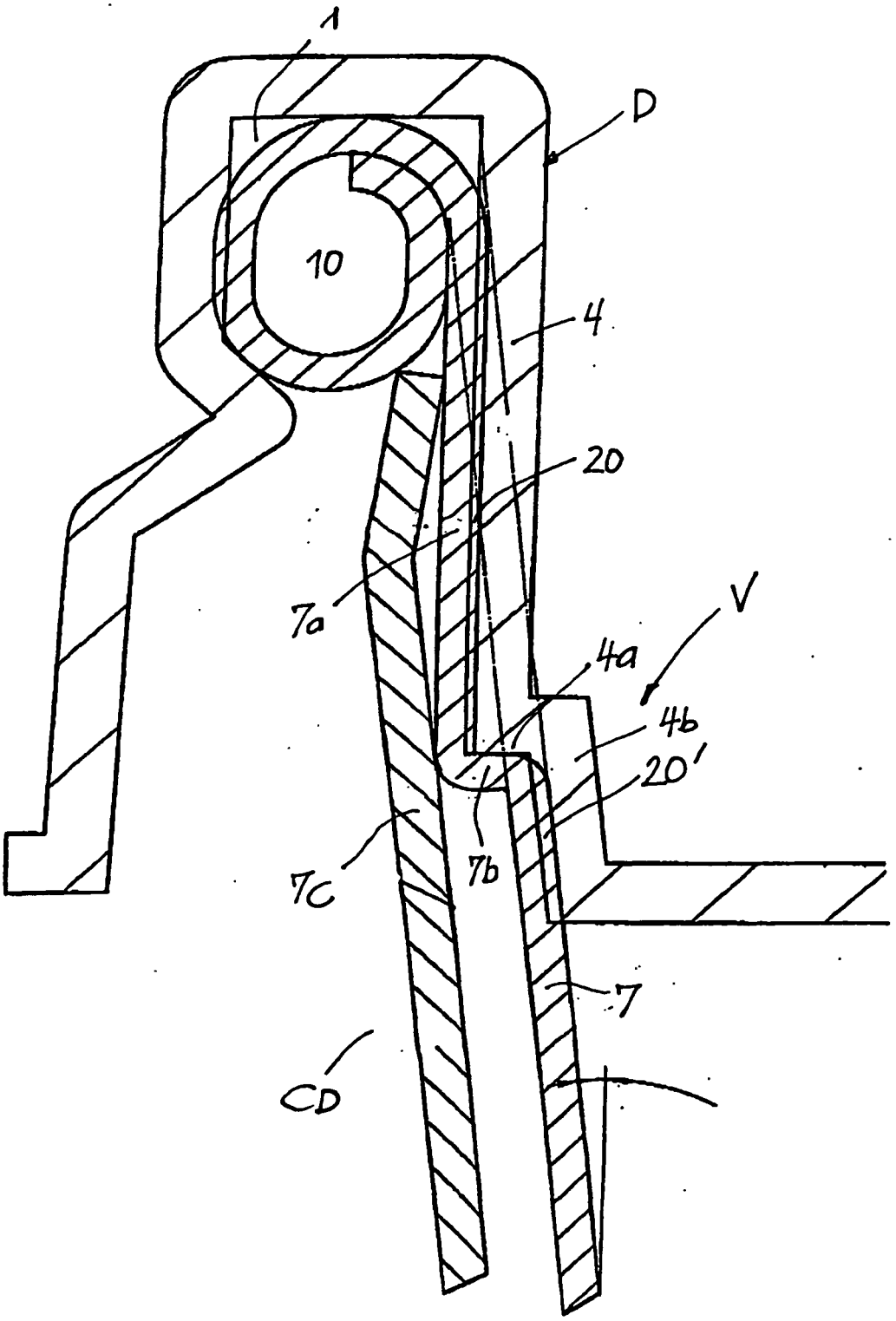


FIG 17



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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