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**Mug fixed to the top or to the bottom of a beverage bottle, beverage bottle
designed for receiving same, and related combination**

Technical Field

The invention relates to a cup for placement onto the top or the bottom of a beverage bottle, a beverage bottle to hold a placed cup, and a combination of same.

Prior Art

It is known from prior art to provide beverage bottles with a cup usable for drinking purposes, which is placed under the bottom end of the beverage bottle. Thus, US-A-5,499,738, US-A-4,505,390, FR-A-26 46 071 and JP-A-90 20 342 disclose beverage bottles having cups accommodated at the bottom end which are usable for drinking purposes. Moreover, Utility Model DE 299 22 619 U1 discloses a beverage bottle having a detachably attached cup, wherein the bottle end is so adapted to the cup that the outer diameter of the bottle approximately corresponds to that of the cup. With the known beverage bottles, however, the placement of the cup onto the beverage bottle is made difficult in that, due to the highly air-tight contact zones between the cup rim and the beverage bottle wall, an overpressure (mounting) or an underpressure (removal) is formed in the inner cup space. This effect is particularly marked when the contact zone, such as in DE 299 22 619 U1, is configured as a tight press fit or a circumferential bead. As a consequence, pressure and suction forces arise in the inner cup space, and the placement can only ensue with a relatively high use of force or by inclining and/or shaking the cup. This impediment of placement has an unfavorable effect on the convenience of said bottle or cup. Moreover, the automated placement of the cup onto the top or under the beverage bottle is also made more complicated in which the possible inclinations or shaking movements of the cup can result in an undesired extra expenditure in the production process.



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Description of the Invention

The present invention is based on the technical problem of providing a beverage bottle having a placeable cup, in which the placement is effected with a low use of force.

This technical problem is solved by a cup for placement onto the top or bottom of a beverage bottle, having the features of claim 1, a beverage bottle to hold a cup capable of being placed onto the top or bottom, having the features of claim 2, and by a combination of same, having the features of claim 3. Advantageous further developments are indicated in the subclaims.

The present invention is based on the idea of facilitating the placement of the cup on the top or under the beverage bottle in that during placement, a gas exchange between the inner cup space and the environment is allowed to take place. For this purpose, a cup for placement onto the top or bottom of a beverage bottle, a beverage bottle to hold a cup capable of being placed onto the top or bottom, or a combination of a cup and beverage bottle are provided, in which the contact zone between the cup rim and the beverage bottle wall unilaterally or bilaterally comprises a profile permitting gas to pass through.

Due to the profiled contact zone between cup rim and beverage bottle wall, a significantly simplified placement of the cup ensues. The use of the beverage bottle having a placeable cup is considerably more convenient since the mounting and the removal of the cup can be effected with little use of force and without any possible inclinations or shaking movements of the cup. Thereby, the automated mount of the cup, e.g. during the production process, is also rationalized.

According to a first further development of the present invention, the profile of the cup or the bottle comprises nubs or similar punctiform elevations. Moreover, the beverage bottle can comprise notches in the direction of the inner bottle space. Hereby, a gas flow can arise during placement in the free spaces between the nubs or in a zone which is not provided with nubs, with said gas flow facilitating the mounting or the removal of the cup.

To guarantee a sterile and splash-proof sealing of the inner cup space as soon as the cup is placed onto the top of the beverage bottle, the profile of the cup or the beverage bottle comprises according to a further development of the present invention a labyrinth seal having ribs preferably arranged in the circumferential direction of the cup as well as free spaces between said ribs. Thus, splash water can be prevented from penetrating into the inner cup space, which can, for example, occur with external cleaning of the beverage bottle so that the optical appearance and the hygienic state of the inner cup space are improved. Moreover, the labyrinth seals prevents germs from penetrating into the inner cup space so that as a whole a hygienic, sterile state of the inner cup space is ensured. At the same time, the labyrinth seal has the quality also of enabling gas to be exchanged between the inner cup space and the environment during placement such that the placement of the cup onto the top or bottom of the beverage bottle can continue to ensue with little use of force. The ribs can be arranged in one or more, preferably in two parallel rows.

According to a further preferred embodiment, the beverage bottle and/or the cup consist of plastic, and it is namely particularly preferred that the bottle be made of polyethylene terephthalate (PET), and the cup of polypropylene (PP). To protect the bottle or cup contents from environmental influences or to improve the optical appearance, the plastic material may also be colored. Simultaneously, the weight of the bottle and/or cup is decreased with respect to the usual fillers (beverages), thus causing a downward shift of the overall center of gravity to occur and, hence, an increased static stability to be achieved. In addition, products made of PET or PP can be produced in a cost-efficient manner.

The cup can comprise a recess for receiving food, advertisement or other auxiliaries, which are preferably sealed by a sealing. Moreover, corresponding products can also be arranged in the inner cup space. *In toto*, the attractivity and efficiency of the combination can hereby be considerably increased. It will give a boost to its market acceptance since only one packing drum is required for packing several products of also different physical conditions.

According to another further development of the invention, the cup comprises a lower and an upper cone-shaped zone having different cone angles, with the lower zone being more inclined with respect to the cup axis than the upper zone. Moreover, the cup comprises a transition between the upper and the lower zone, which is configured in a stepped manner. This configuration enables similar cups to be placed in one another, entailing a considerable saving of space when the cups are transported during the production or filling process.

According to a further development of the invention, the inner diameter of the cup profile corresponds in the zone of contact with the beverage bottle to the outer diameter of the outer beverage bottle shell. Thus, the cup can be placed onto the top or bottom of the beverage bottle without exerting pressure. A contact pressure between the cup's profile and the outer beverage bottle shell only occurs when the beverage bottle is filled with a beverage and is closed, and as a result, has expanded. The cup is held fast by this to the closed beverage bottle. However, as soon as the beverage bottle is opened, the contact pressure between the cup's profile and the outer beverage bottle shell decreases at least in part, so that the cup can be removed without any problem.

According to a further development of the invention, the beverage bottle comprises in the zone of the placed cup a smaller outer diameter than in the adjacent zone. Preferably, the difference of the outer diameters is so designed that the outer diameter of the placed cup is flush with the adjacent diameter of the beverage bottle. In this way, an attractive appearance of the combination is achieved since the beverage bottle and cup are perceived as one unit. This is particularly the case when the transition between the cup and the beverage bottle is covered advantageously with a label. Moreover, the risk of an inadvertent pulling of the cup off of the beverage bottle due to a projection from the bottle is reduced, and the step constitutes a further protection against the penetration of splash water or particles into the inner cup space. Hereby, the combination can also run through conventional filling plants without any problem.

The combination of beverage bottle and cup according to the invention is particularly suitable for a mobile offering of beverages at any given location, e.g. during journeys.

Therefore, it is particularly advantageous to configure the beverage bottle with relatively small dimensions, preferably for filling volumes of 200, 250, 330 and 500 ml.

Short Description of the Drawings

With reference to the annexed drawings, the present invention will be explained and described in detail in the following. Therein is shown:

- Fig. 1 a diagrammatic side view of a cup according to the invention, a beverage bottle according to the invention, as well as a combination of same;
- Fig. 2 a diagrammatic partial view of a vertical half-section of a cup according to the invention;
- Fig. 3 a diagrammatic side view of a further beverage bottle according to the invention.

Detailed Description of Embodiments of the Invention

In Figure 1, a cup, a beverage bottle and a combination of same according to a first embodiment of the present invention are shown in a diagrammatic representation, Figure 2 shows a diagrammatic partial representation of a vertical section of cup 1 of Figure 1.

The cup 1 consists of a lower cone-shaped zone 27, an upper cone-shaped zone 29, a stepped transition zone 31 interposed between said zones, and a cup bottom 24, all jointly enclosing the inner cup space 7. The inclination of the lower cone-shaped zone 27 with respect to the cup axis is steeper than that of the upper cone-shaped zone 29 such that the cup 1 can be stacked with similar cups.

The terms "upper" and "lower" pertaining to the cup and the beverage bottle refer to the normal orientation, i.e. when the cup is disposed with its drink opening facing upwardly and the bottle is disposed with its cap facing upwardly on a surface. As can be clearly seen from Figure 1, these directions, at least for the cup, reverse when offered. Hence, the direction designations are only for simplifying the illustration. A restriction of the invention is not effected by this.

Moreover, the cup 1 comprises a recess 23 underneath the cup bottom 24, which (24) is closed with a sealing 25 and can receive food, advertisement or other auxiliaries.

At the inner side of the upper cone-shaped zone 29 (Fig. 2), the cup comprises a profile having three rows 19 with 24 nubs 11 each arranged staggered to the adjacent row. Said nubs 11 comprise each a peak 21 spaced apart from an adjacent peak by an opening angle of 15° , i.e. the nubs are uniformly arranged along the inner circumference of said cup 1. The clearance opening angle WL between the individual nubs 11 is 12° , the height H of the nubs is about 0.2 mm. The nub height and said nub spacing has turned out to be particularly preferred. However, it has also turned out that deviations in the nub height of $\pm 15\%$ still ensure satisfying results. The spacing of the nubs may likewise be slightly modified without abandoning the advantages of the present invention. Even a circular geometry such as it is illustrated in the attached figures is not necessary to achieve the desired technical effect of the nubs.

The profile of the cup 1 further comprises a labyrinth seal 13 having ribs 15 arranged in two rows in the circumferential direction, with said labyrinth seal 13 being disposed within the zone provided with ribs at the inner surface of said cup. In each row, 12 similar and uniformly distributed ribs are provided, preferably comprising together a sealing length of $2/3$ of the cup's inner circumference. The ribs have interspaces 16 between each other, in which nubs 11 come to rest, and are arranged staggered so that they cover in each case the interspace 16 of the adjacent rib row. The height H2 of the ribs is about 0.2 mm, the clearance right-angle spacing AL between two adjacent rib rows 33 is 0.24 mm. For the height of the ribs, it has turned out as well that a deviation of $\pm 15\%$ achieves the desired effect. Just as the spacing of the nubs 11 from each other can be modified in the cup's circumferential direction of the cup, modifications in the clearance right-angle spacing AL are also possible between two adjacent rib rows 33 as well as of the clear width WL of two adjacent ribs upon achievement of the advantages of the present invention.

The beverage bottle 2 (Fig. 1) consists of a bottle shell 43 in the middle bilaterally connected by a circumferential, stepped transition 44 to one outer bottle shell 45 each.

One of the outer bottle shells is connected, via a further circumferential, stepped transition 46, to a bottle neck 39 narrowing towards a mouth 41. The opposite outer bottle shell 45 is connected, via a further circumferential, stepped transition 46, to a bottle bottom 47. Moreover, the bottle shell 43 comprises circumferential grooves 37, the function of which will be described later. The outer bottle shells 45 are arranged symmetrically to the bottle shell 43 in the middle and comprise notches 17 in the direction of the inner bottle space 35.

The beverage bottle 3 encloses the inner bottle space 35 which serves, for example, for receiving a beverage charge. The beverage bottle 3 and cup 1 consist of a clear or colored plastic material, the bottle preferably of PET, and the cup of PP.

The cup 1 can be placed at the bottle bottom 47 to fit from below (not shown) the beverage bottle 3, or can be placed from above onto the bottle neck 39 of the beverage bottle 3 (Fig. 1) so as to form said combination 5. A placement of the cup 1 over the bottle neck 39 has the advantage that said combinations 5 can be stacked one upon the other without the necessity of providing separate intermediate bottoms.

In the placed state, the upper edge of the cup 1 is in contact with the circumferential, stepped transition 44, and the nubs 11 as well as the ribs 15 of the labyrinth seal 13 are in contact with the outer bottle shell 45. The cup bottom 24 can moreover rest in a centering manner against the bottle bottom 47 or mouth 41, however, an interspace can be provided.

When placing the cup 1 onto the top or bottom of the beverage bottle 3, the nubs 11 and the ribs 15 slide along the outer bottle shell 45 such that hollow spaces are present between the outer bottle shell 45 and the cup 1, which enable gas to be exchanged between the inner cup space 7 and the environment. As a result of said gas exchange, the placement of the cup is significantly facilitated. At the same time, the labyrinth seal 13 of the cup 1 provides a splashwater-proof and sterile sealing of the inner cup space 7. Tests show that said double function of the labyrinth seal is best realized when the sealing length of said ribs 15 of each row 33 is between $1/2$ and $3/4$, preferably $2/3$, of the circumference to be sealed.

The outer diameter DG' of the bottle shell 43 in the middle corresponds to the maximum outer diameter DB' of the upper cone-shaped zone 29 of the cup 1. Thus, a stepless transition from the bottle shell 43 in the middle to the cup 1 is guaranteed.

The outer diameter DG of the outer bottle shell 45 corresponds to the inner diameter DB of the profile, i.e. the nubs 11 and ribs 15 of the cup 1. Thus, the cup 1 can be placed onto the top or bottom of beverage bottle 3 without exerting pressure.

A contact pressure between the nubs 11 and/or ribs 15 of the cup 1 and the outer bottle shell 45 arises as soon as said beverage bottle 3 is filled with a beverage and closed and has expanded in the radial direction due to the pressure of the liquid and optionally an additional gas pressure. Thus the cup 1 is held to this when the beverage bottle 1 is closed. However, as soon as the beverage bottle 3 is opened, the contact pressure between the nubs 11 or ribs 15 of the cup 1 and the outer bottle shell 45 decreases at least in part, so that the cup still adheres but can be removed without any problem.

A delimitation of the radial extension of the bottle and, hence, the contact pressure between the nubs 11 and/or ribs 15 of the cup 1 and the outer bottle shell 45 can be achieved by providing circumferential grooves 37 in the bottle shell 43 in the middle. These grooves reduce the rigidity of the beverage bottle 3 in the longitudinal direction of the bottle such that the expansion of beverage bottle 3 is concentrated with an increasing number of grooves 37 at the longitudinal direction of the bottle.

The combination 5 is particularly suitable for a mobile offering of beverages at any given location, e.g. during journeys. It is therefore particularly advantageous to configure the beverage bottle 3 with relatively minor dimensions, preferably for filling volumes of 200, 250, 330 and 500 ml.

Figure 3 illustrates a further embodiment of the present invention, wherein the beverage bottle 103 has a compact shape and dimensions and is in particular suited for small filling volumes, preferably for a filling volume of 200 ml. The beverage bottle 103 principally corresponds to the beverage bottle 3 as per Figure 1, however, is only provided for placement of one cup onto the bottle bottom 147. Accordingly, the beverage bottle 103

only comprises an outer bottle shell 145 unilaterally which is connected to the bottle shell 143 in the middle via a circumferential, stepped transition 144. As in Fig. 1, the outer bottle shell 145 has notches 117 towards the inner bottle space 135 which enable gas to be exchanged between the inner cup space and the environment during placement together with the profile of a cup corresponding essentially to that represented in Fig. 2. Thus, the placement of the cup is considerably simplified.

At the opposite side of beverage bottle 103, the bottle shell 143 in the middle merges into a bottle neck 139 and finally a mouth 141, i.e. corresponding to the usual configuration of beverage bottles. Thus, the production process of the beverage bottle 103 can be simplified, which results in a savings of time and costs.

Patent Claims

1. A cup (1) for placement onto the top or bottom of a beverage bottle (3), characterized in that at least that zone (9) of the cup, which is in contact with the beverage bottle (3) during placement, comprises a profile (11, 13, 15) allowing for a gas exchange between the inner cup space (7) and the environment during placement.
2. A beverage bottle (3) to accommodate a cup (1) placeable onto the top or bottom, characterized in that at least that zone (9') of the beverage bottle which is in contact with the cup (1) during placement comprises a profile (17) allowing a gas exchange between the inner cup space (7) and the environment during placement.
3. A combination (5) of a beverage bottle (3) and a cup (1) placeable on at least one end of said beverage bottle and thus in contact with said end, characterized in that said cup (1) and/or said beverage bottle (3) comprise(s) a profile (11, 13, 15, 17) in the zone of contact (9, 9'), said profile (11, 13, 15, 17) allowing a gas exchange between the inner cup space (7) and the environment during placement.
4. Cup (1) according to claim 1, beverage bottle (3) according to claim 2, or combination (5) according to claim 3, characterized in that the inner diameter of the cup profile (DB) corresponds in the zone of contact (9, 9') to the outer diameter (DG) of the outer beverage bottle shell (45).
5. Cup (1) according to claim 1 or 4, beverage bottle (3) according to claim 2 or 4, or combination (5) according to claim 3 or 4, characterized in that said profile comprises nubs (11).
6. Cup (1), beverage bottle (3) or combination (5) according to claim 5, characterized in that said nubs (11) have a height (H) of $0.2 \text{ mm} \pm 15 \%$.
7. Cup (1), beverage bottle (3) or combination (5) according to claims 5 or 6, characterized in that said nubs (11) are arranged in at least one row (19) and each have a peak (21) spaced apart from an adjacent peak by an opening angle of 15° , the clearance opening angle (WL) between said nubs being preferably 12° .

8. Cup (1), beverage bottle (3) or combination (5) according to claims 5, 6 or 7, characterized in that said nubs (11) are arranged staggered in several, preferably three, parallel rows (19).
9. Cup (1) according to any one of claims 1 or 4 through 8, beverage bottle (3) according to any one of claims 2 or 4 through 8, or combination (5) according to any one of claims 3 through 8, characterized in that said profile comprises a labyrinth seal (13) having ribs (15) arranged along the circumference.
10. Cup (1), beverage bottle (3) or combination (5) according to claim 9, characterized in that said ribs (15) have a height (H2) of $0.2 \text{ mm} \pm 15 \%$.
11. Cup (1), beverage bottle (3) or combination (5) according to claims 9 or 10, characterized in that said ribs (15) are arranged spaced apart from each other in at least one row (33) and comprise a total sealing length within one row (33) which is between $1/2$ and $3/4$, preferably $2/3$, of the circumference to be sealed.
12. Cup (1), beverage bottle (3) or combination (5) according to any one of claims 9 through 11, characterized in that said ribs (15) are arranged staggered in several, preferably in two, parallel rows (33).
13. Cup (1), beverage bottle (3) or combination (5) according to claim 12, characterized in that the clear spacing (AL) of the ribs at right angles to the parallel rows (33) is 0.24 mm.
14. Cup (1), beverage bottle (3) or combination (5) according to claims 9 through 13, characterized in that the zones in contact with the labyrinth seal (13) in the placed state have a smooth surface.
15. Cup (1) according to any one of claims 1 or 4 through 14, beverage bottle (3) according to any one of claims 2 or 4 through 14, or combination (5) according to any one of claims 3 through 14, characterized in that said beverage bottle (3) and/or cup (1) are made of plastic material, the bottle preferably of PET and the cup of PP.

16. Cup (1) according to any one of claims 1 or 4 through 15, or combination (5) according to any one of claims 3 through 15, characterized in that cup (1) comprises a recess (23) for receiving food, advertisement or other auxiliaries, said recess (23) being closed preferably by a sealing (25).
17. Cup (1) according to any one of claims 1 or 4 through 16, or combination (5) according to any one of claims 3 through 16, characterized in that said cup (1) comprises a lower cone-shaped zone (27) and an upper cone-shaped zone (29), and in that the lower or upper cone-shaped zones comprise different cone angles.
18. Cup (1) or combination (5) according to claim 17, characterized in that the transition (31) between the lower (27) and the upper (29) cone-shaped zone is configured in a stepped manner, the height of the step preferably corresponding to the wall thickness of the cup.
19. Beverage bottle (3) according to any one of claims 2 or 4 through 14, or combination (5) according to any one of claims 3 through 18, characterized in that the profile of beverage bottle (3) comprises notches (17) in the direction of the inner beverage bottle space (35).
20. Beverage bottle (3) according to any one of claims 2, 4 through 14 or 19, or combination (5) according to any one of claims 3 through 19, characterized in that the outer diameter (DG) of the outer beverage bottle shell (45) is smaller in the zone of the placed cup (1) than the outer diameter (DG') of the beverage bottle shell (43) in the middle in the adjacent zone.
21. Beverage bottle (3) or combination (5) according to claim 20, characterized in that the outer diameter (DG) of the outer beverage bottle shell (45) is smaller than the outer diameter (DG') of the beverage bottle shell (43) in the middle by that amount that the outer diameter (DB') of the placed cup is flush with the adjacent outer diameter (DG') of the beverage bottle shell (43) in the middle.

22. Beverage bottle (3) according to any one of claims 2, 4 through 14 or 19 through 21, or combination (5) according to any one of claims 3 through 21, characterized in that beverage bottle (3) comprises a label covering at least in sections the zone of contact between cup and beverage bottle.
23. Use of a combination (5) according to any one of claims 3 through 22 for offering a volume of liquid (V) of 200, 250, 330 or 500 ml.