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(54) **CUPS FOR BEVERAGE DISPENSING**

BECHER ZUR AUSGABE VON GETRÄNKEN

GOBELETS POUR LA DISTRIBUTION DE BOISSONS

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(56) References cited:
WO-A-2004/074111 FR-A- 2 171 306
GB-A- 2 073 581 GB-A- 2 128 468
US-A- 3 227 273 US-A- 3 471 075
US-A1- 2002 130 170

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Description

[0001] The present invention relates to improved paper cups for use in beverage dispensing systems of the in-cup type.

[0002] In-cup beverage dispensing systems are based on stacks of disposable cups, each cup containing a portion of beverage concentrate in its base. The cups are nested together in the stack, and the stack is then packaged, stored and transported conveniently by the vending operator. In use, the stack is removed from its packaging and loaded into the dispenser of a dispensing machine. In response to a dispense command, the machine automatically splits a cup from the bottom of the stack and fills it with water to form the desired beverage. A typical in-cup system is available under the Registered Trade Mark KLIX from the Mars Drinks division of Mars, Incorporated.

[0003] These beverage dispensing systems provide the advantage that the beverage concentrate is supplied with the cups, so that the stocking and operation of the beverage dispenser are simplified. The stack of cups is compact and easy to transport. The water for dilution of the beverage is provided at the dispensing machine, typically from a conventional water supply, with optional purification, heating or cooling in the dispensing machine.

[0004] Current, commercially-available in-cup systems all use plastic cups, for example as described in GB-A-2128468. The cups are formed by molding of thermoplastics such as polystyrene. Plastic cups are used because they can be molded with great precision, which is considered necessary in order to provide snap-fitting projections in the cup that provide an effective seal between successive cups in the stack and a substantially constant separation force for separation of individual cups from the stack in the dispensing machine. In addition, plastic cups can be molded with an internal ledge to hold the cups in the correct spacing in the stack and prevent the cups from becoming jammed together (known herein as "telescoping") by the application of an axial compressive force on the stack. Plastic cups of this kind are described, for example, in GB-A-1525132.

[0005] It would be desirable to provide an in-cup system based on paper cups. A system based on paper cups would be regarded as more environmentally friendly by consumers. However, the snap-fitting projections and anti-telescoping features of conventional, plastic cups for in-cup systems cannot simply be reproduced in paper, because paper cannot be shaped with the same precision as plastic, and does not have the same resilience as plastic.

[0006] In-cup systems based on paper cups were proposed in the 1960's. For example, US-A-3227273 describes an in-cup system based on a stack of paper cups, wherein each cup has a conical side wall and a circular base inserted and bonded into the narrow end of the conical side wall to give recessed base. Successive cups in the stack form an interference fit, with the base of each

cup supporting the bottom of the next higher cup in the stack. A difficulty with this arrangement is unpredictable separation forces due to small variations in the interference fit between the cups. This problem is exacerbated when particles of the ingredient are trapped between the side walls of the stacked cups. In order to alleviate the problem, US-A-3227273 teaches filling the cups by inverting each cup, depositing the ingredient into the recessed base of the cup, and then applying the next cup in the stack over the inverted cup. This filling method helps to keep the side walls of the cups free of ingredient, thereby giving a more consistent interference fit between the cups. However, the method requires the use of cups with a deeply recessed base, and problem of unpredictable separation forces between the cups remains.

[0007] GB-A-2055038 addresses the above problem of imperfect interference fit between successive paper cups in a stack. It describes cups having a similar construction to those of US-A-3227273, but with an outward taper near the bottom of the cups, whereby the interference fit is formed primarily between an outer surface of the cup near the bottom of the cup and an internal surface of the next successive lower cup adjacent to the base of that cup. This arrangement also requires the use of cups having a deeply recessed base, and does not overcome the problem of variable separation force.

[0008] US-A-3526316 describes an in-cup system based on a stack of paper or plastic cups, wherein each cup has a side wall and a base, and indentations are provided in the side wall upon which the base of the next cup in the stack rests. This arrangement provides poor sealing between successive cups in the stack, allowing beverage ingredient to escape from the stack when the stack is inverted. The separation force needed to split each cup from the bottom of the stack remains unpredictable. Furthermore, this arrangement is prone to telescoping when an axial compressive force is applied to the stack.

[0009] EP-A-1227042 described paper cups having an anti-telescoping feature in the form of a circumferential indentation in the side wall of the cup, located above the base of the cup.

[0010] FR-A-2171306 describes cups for an in-cup beverage dispensing system, wherein the cups have interlocking ribs to assist stacking and separation. The material of the cups is not disclosed, but it seems clear from the description and drawings that they are plastic cups, not paper cups.

[0011] US-A-3471075 describes a plastic cup for use in vending machines. The cup has a special arrangement of ribs that allows an insulating foam coating to be applied to part of the outside surface of the cup.

[0012] US-A-2002/0130170 describes paper cups having embossed circumferential ribs to assist gripping of the cup.

[0013] GB-A-2073581 describes further plastic cups for use in automated in-cup beverage dispensing systems. The cups have a complex profile with interlocking

ribs.

[0014] WO-A-2004074111 describes paper cups for a manual in-cup beverage dispensing. The cups have frustoconical side walls without indentations. A portion of a beverage ingredient is located inside the cups and sealed with a freshness barrier membrane that is removed by pulling on a tab before preparation of the beverage.

[0015] In a first aspect, the present invention provides a paper cup for an in-cup beverage dispensing system, wherein the cup comprises: a tapered tubular body having an wide top end that is open and a narrow bottom end that is closed in liquid-tight fashion by a base sheet extending transversely across the tubular body, wherein the cup further comprises: a first indentation in the side wall at a first location above the base of the cup, and a second indentation in the side wall at a second location above the base of the cup, wherein the indentations are positioned and configured such that the second indentation of a first cup according to the invention engages with the first indentation of a second, identical cup according to the invention to resist relative axial movement of the cups when the second cup is nested inside the first cup, characterized in that the cup is configured so that, when first and second said cups are nested with the indentations engaged, the base of the lower cup does not abut the bottom of the upper cup, and said cup further comprises an anti-telescoping feature in the form of a third indentation located below the second indentation, wherein the spacing between the third indentation and the second indentation is substantially equal to the spacing between the bottom of the cup and the third indentation, whereby the third indentation functions as a ledge that supports the bottom of the second cup when the cups are nested with the first and second cups are nested with the first and second indentations in engagement.

[0016] The base sheet in the cups according to the present invention may extend across the bottom of the tubular body (non-recessed base, for example in cups formed by deep-drawing), or it may extend across the tubular body at a distance from the bottom (recessed base, for example formed by inserting and bonding a disc-shaped sheet with a circumferential flange into the bottom of the tubular body). Suitably the depth of the recessed base is less than about 10mm, for example less than about 6mm. This maximizes the volume of the cup that is available for the beverage.

[0017] The indentations preferably engage so as to resist relative axial movement of the cups in both axial directions from the nested position, i.e. to resist both separation of the cups and telescoping of the cups. For example, the second indentation in the second cup may nest within the first indentation in the first cup at the engagement position. Resistance to separation of the cups comes mainly from the engagement between the indentations, which means that the force required to separate the cups is more constant and controllable than in prior art paper cup systems, in which the resistance to separation was due solely to the interference fit between ad-

jacent cups.

[0018] The term "indentation" suitably refers to a groove or rib formed in the side wall of the cup. The thickness of the side wall is suitably substantially constant, so that there is a complementary projection in the side wall opposite to the indentation. Suitably, the indentations comprise or consist essentially of embossed regions in the side walls defining the tubular body. The indentations may project inwardly or outwardly from the side wall of the cup, but preferably the first and second indentations project the same way so that the first and second indentations can nest together at the engaged position. The indentations are preferably configured as rings that extend around the side wall of the cup, preferably substantially coaxially with the principal axis of the cup. The ring indentations may be interrupted or partial, but preferably they extend substantially continuously around the side wall so as to apply a balanced force, and to resist leakage of the beverage ingredient stored between successive cups in a stack..

[0019] The maximum depth of the indentations is suitably from 0.5mm to 3mm, for example from 1mm to 2mm. The width of the indentations (measured along the axis of the cup) is suitably 2mm to about 5mm, for example 2mm to 4mm.

[0020] The first and second indentations are located above the base of the cup, with the first indentation being located above the second indentation. This confers greater stability against rocking of the cup stack than would be achieved by indentations engaging proximate to the base of the cup, and reduces the possibility that ingredient in the base of the lower cup may interfere with engagement of the indentations. Suitably, the second indentation is located from 5mm to 50mm above the base of the cup, for example from 10mm to 30mm above the base of the cup. Suitably the first indentation is located from 10mm to 15mm above the second indentation.

[0021] The locations of the first and second indentations are selected so that, when stacked with the indentations engaged, the vertical spacing between the lip of the first cup and the lip of the second cup is suitably in the range of from 10mm to 15mm. This spacing suitably corresponds to the vertical spacing between the first and second indentations. The use of indentations according to the present invention permits this vertical spacing to be optimized for cup separation in each dispensing apparatus.

[0022] The cups according to the present invention are configured so that, when stacked with the indentations engaged, the base of the first cup does not contact the bottom of the second cup. That is to say the interior surface of the base of the first cup does not contact the bottom of next successive cup above the first cup in the stack. Suitably, the vertical spacing between the base of the first cup and the bottom of the second cup in said stacked configuration is from 1mm to 15mm, for example from 5mm to 10mm. This provides the advantage that beverage ingredient in the base of the first cup cannot

interfere with stacking of the cups by becoming blocked under the bottom of the second cup, thereby removing the need to load the cups by inverting the cups and filling the recessed bases as taught in US-A-3526316.

[0023] The cups according to the present invention comprise one or more further anti-telescoping features in addition to the engagement between the first and second indentations.

[0024] The cups according to the present invention comprise a further anti-telescoping feature in the form of a third circumferential indentation located below the second indentation, wherein the spacing between the third circumferential indentation and the second indentation is substantially equal to the spacing between the bottom of the cup and the third indentation. The third indentation in the first cup functions as a ledge that supports the bottom of the second cup when the cups are nested with the first and second indentations in engagement.

[0025] Additionally, the cups according to the invention may comprise an insert, preferably of paper, in the bottom of the cup, wherein an upper edge of the insert is spaced above the base of the cup to support the bottom of the next successive cup when the cups are nested with the first and second indentations in engagement. The insert is hollow to accommodate the beverage preparation ingredient. The insert may suitably comprise a tubular sheet or a saucer-shaped sheet that is wedged or bonded into the bottom of the cup. For example, the insert may be wedged below the third indentation as described above. In certain embodiments, the insert is a saucer-shaped insert having a base that abuts the base of the cup and side walls that abut the inside of the side wall of the cup, said upper edge being located at the top of the side walls of the saucer. The insert is preferably also formed of paper.

[0026] The cups according to this invention are paper cups. That is to say, at least the tubular body and preferably substantially the whole cup is made from paper. The term "paper" encompasses all wet-laid cellulosic sheet materials, including cartonboard, and coated papers. Suitably, the sheet material used to form the cups is a typical paper stock for beverage and food containers having thickness in the range of from about 0.25mm to about 1mm, for example from about 0.25mm to about 0.6mm. The paper is suitably coated on at least the inner surface with a water-resistant, food-acceptable coating, for example a polyethylene film coating. It will be appreciated that the cups according to the invention are suitably single-wall cups, but they may be insulating double-walled cups in certain embodiments. A paper handle of conventional construction may be attached to the side wall above the first indentation, such that the handle is folded flat against the side wall when the cups are stacked.

[0027] The tapered tubular body of the cup is preferably substantially frustoconical. It may be formed in conventional fashion, for example by bending an arcuate cup preform into the tapered tube shape and bonding the

preform along opposed edges to fix the tubular shape. Preferably, an outwardly projecting lip, such as a rolled lip, is provided at the top of the cup to assist drinking from the cup, and to provide increased rigidity to the top of the cup. The rolled lip also provides a flange surface upon which the cup splitting mechanism of the dispensing apparatus can act.

[0028] The indentations are suitably provided in the preform, for example by embossing, before the preform is shaped into the tapered tube. The base is suitably formed from a disc of the paper material having an in-turned circumferential flange that is bonded to the inside of the tubular body proximate to the narrow end thereof. In alternative embodiments, the indentations may be formed in the side walls after forming of the tubular body by mounting the tubular body on a revolving support and indenting with a knurl as described in EP-A-1227042.

[0029] In a second aspect, the present invention provides a method of making a paper cup according to the invention, comprising the steps of: forming an arcuate preform of paper sheet material having first and second straight edges and first and second curved edges, wherein the preform is embossed with two or more arcuate lines of embossing extending substantially perpendicular to the radius of curvature of the curved edges, bending the preform into a tapered tube and fixing the straight edges together to form a tapered tube having rings of embossing extending around the tube, and fixing a base into the narrow end of the tube.

[0030] In a third aspect, the present invention provides a stack of at least two paper cups according to the invention, wherein the first and second indentations of each adjacent pair of cups in the stack are engaged, and wherein a portion of a beverage preparation ingredient is stored between the bases of each adjacent pair of cups in the stack.

[0031] The beverage preparation ingredient is normally a solid, water-soluble or water-dispersible ingredient. The ingredient is suitably a substantially shelf-stable beverage concentrate, such as fruit-flavored drink concentrate, soluble coffee solids or soluble tea solids. Preferably, the total weight of the food or beverage concentrate in each cup is from about 0.5 grams to about 100 grams, preferably from about 1 gram to 20 grams.

[0032] Suitably, the stack according to this aspect of the invention contains at least about 5 cups, for example at least about 10 cups. Suitably, the stack is packaged in an oxygen-and moisture-impermeable container, such as a bag or a shrink-wrap.

[0033] The stack according to this aspect of the invention may be used in conventional in-cup dispensing machines with minimal modification.

[0034] Any feature that has been described in relation to any one aspect of the invention may also be applicable in relation to any other aspect of the invention.

[0035] An embodiment of the present invention will now be described in detail, for the purpose of illustration, with reference to the accompanying drawings, in which:

Figure 1 shows a perspective view of a cup according to the invention;

Figure 2 shows a longitudinal cross-section through the cup of Fig. 1;

Figure 3 shows a side elevation view of a stack of two cups according to the embodiment of Fig. 1; and

Figure 4 shows a longitudinal cross-section through the stack of Fig. 3;

[0036] Referring to Figs. 1 and 2, the cup 1 according to this embodiment of the invention comprises a tapered cylindrical body 2 formed of white paper stock having thickness approximately 0.5mm and coated with a thin polyethylene waterproofing film on its inner surface. The body 2 is formed from an arcuate preform by bending the preform into a cylinder and bonding the edges of the preform together with adhesive along seam 7. The top of the cylindrical body 2 is open, and is provided with a rolled lip 4 to assist drinking, and to provide enhanced rigidity to the top of the cup. A base 3 of the same paper material is inserted into the bottom of the cylindrical body and bonded thereto in conventional fashion by means of circumferential flange 5 on the base 3. The base 3 is thereby recessed about 5mm from the bottom 6 of the cup.

[0037] The cup body 2 is provided with a first circumferential indentation 8, a second circumferential indentation 9, and a third circumferential indentation 10, all of which are embossed in the paper stock material. The vertical spacing between the first circumferential indentation 8 and the second circumferential indentation 9 is approximately equal to the vertical spacing between the bottom 6 of the cup and the third circumferential indentation 10. Likewise, the vertical spacing between the second circumferential indentation 9 and the third circumferential indentation 10 is approximately equal to the vertical spacing between the bottom 6 of the cup and the third circumferential indentation 10.

[0038] A cup-shaped insert 13 of the same paper stock material is wedged under the third circumferential indentation 10.

[0039] Referring to Figs. 3 and 4, a second cup 14 is nested inside the first cup 1. In this configuration, the lip 15 of the second cup is separated from the lip 4 of the first cup by a vertical distance of from about 1cm to about 1.5cm. This vertical distance is suitable for mechanical splitting of the cups in a dispensing machine. The stacked cups resist separation and telescoping by virtue of the nesting between the first and second indentations 8,9 on the first cup and the second and third indentations 16,17, respectively, on the second cup.

[0040] Telescoping of the stacked cups is also resisted by the abutment between the bottom 20 of the second cup and the top of the insert 13 inside the first cup. This abutment is assisted by the third circumferential indentation 10 in the first cup.

[0041] A powdered or granular beverage preparation ingredient 18 is enclosed in the bottom of the first cup. It can be seen that the nesting between the indentations

in the first and second cups provides a seal to prevent escape of the powdered ingredient and ingress of moisture to the powdered ingredient. Furthermore, it can be seen that the powdered ingredient is unlikely to interfere with the abutment of the bottom of the second cup with the first cup, because there is a substantial clearance between the bottom of the second cup and the base of the first cup. This means that the cups can be loaded with the ingredient 18 and stacked without having to invert the cups as described in US-A-3526316.

[0042] The above embodiment has been described by way of example only. Many other embodiments falling within the scope of the accompanying claims will be apparent to the skilled reader.

Claims

1. A paper cup (1) for an in-cup beverage dispensing system, wherein the cup comprises: a tapered tubular body (2) having an wide top end that is open and a narrow bottom end that is closed in liquid-tight fashion by a base sheet (3) extending transversely across the tubular body, wherein the cup further comprises: a first indentation (8) in the side wall at a first location above the base (3) of the cup, and a second indentation (9) in the side wall at a second location above the base (3) of the cup, wherein the indentations (8,9) are positioned and configured such that the first indentation (8) of a first cup (1) according to the invention engages with the second indentation (16) of a second, identical cup (14) according to the invention to resist relative axial movement of the cups when the second cup (14) is nested inside the first cup (1), **characterized in that** the cup is configured so that, when first and second said cups are nested with the indentations (8,16) engaged, the base (3) of the first cup (1) does not abut the bottom (20) of the second cup (14), and said cup (1) further comprises an anti-telescoping feature in the form of a third indentation (10) located below the second indentation (9), wherein the spacing between the third indentation (10) and the second indentation (9) is substantially equal to the spacing between the bottom of the cup and the third indentation (10), whereby the third indentation (10) functions as a ledge that supports the bottom (20) of the second cup (14) when the cups (1,14) are nested with the first and second indentations (8,16) in engagement.
2. A paper cup (1) according to claim 1, wherein first and second indentations (8,9) are positioned and configured such that the second indentation (16) in a second cup (14) nests within the first indentation (8) in the first cup (1) when the second cup (14) is nested inside the first cup (1) to resist relative axial movement of the cups in both axial directions from

the nested position.

3. A paper cup (1) according to claim 1 comprising said third indentation (10), wherein second and third indentations (9,10) are positioned and configured such that the third indentation (17) in a second cup (14) nests within the second indentation (9) in the first cup (1) when the second cup (14) is nested inside the first cup (1) to resist relative axial movement of the cups in both axial directions from the nested position.
4. A paper cup (1) according to any preceding claim, wherein the indentations (8,9,10,16) comprise or consist essentially of embossed regions in side walls defining the tubular body (2).
5. A paper cup (1) according to any preceding claim, wherein the indentations (8,9,10,16) comprise substantially continuous indented rings extending around the tubular body (2).
6. A paper cup (1) according to any preceding claim, wherein the second indentation (9) is spaced from the base (3) of the cup by a vertical distance of from 5mm to 50mm.
7. A paper cup (1) according to any preceding claim, wherein the first indentation is spaced from the second indentation by a vertical distance of from 10mm to 15mm.
8. A paper cup according to any preceding claim, comprising a further anti-telescoping feature in the form of an insert in the bottom of the cup, wherein an upper edge of the insert is spaced above the base of the cup to abut the bottom of the next successive cup when the cups are nested with the first and second indentations in engagement.
9. A paper cup (1) according to claim 8, wherein the insert is a saucer-shaped insert having a base that abuts the base of the cup and side walls that abut the inside of the side wall of the cup, said upper edge being located at the top of the side walls of the saucer.
10. A stack of at least two paper cups (1,14) according to any of claims 1 to 9, wherein the first and second indentations (8,9,16) of each adjacent pair of cups in the stack are engaged, and wherein a portion (18) of a beverage preparation ingredient is stored between the bases (3) of each adjacent pair of cups in the stack.
11. A stack according to claim 10, wherein the stack is packaged in an oxygen- and moisture-impermeable container.

12. A method of making a paper cup (1) according to any of claims 1 to 9, comprising the steps of: forming an arcuate preform of paper sheet material having first and second straight edges and first and second curved edges, wherein the preform is embossed with two or more arcuate lines of embossing extending substantially perpendicular to the radius of curvature of the curved edges, bending the preform into a tapered tube and fixing the straight edges together to form a tapered tube having rings of embossing extending around the tube, and fixing a base (3) into the narrow end of the tube.

15 Patentansprüche

1. Papierbecher (1) für ein In-Cup-Getränkeausgabesystem, wobei der Becher Folgendes umfasst: einen sich verjüngenden röhrenförmigen Körper (2) mit einem weiten oberen Ende, das offen ist, und einem schmalen unteren Ende, das flüssigkeitsdicht durch eine flächige Basis (3) verschlossen ist, die sich quer über den röhrenförmigen Körper erstreckt, wobei der Becher ferner Folgendes umfasst: eine erste Einbuchtung (8) in der Seitenwand an einer ersten Stelle oberhalb der Basis (3) des Bechers und eine zweite Einbuchtung (9) in der Seitenwand an einer zweiten Stelle oberhalb der Basis (3) des Bechers, wobei die Einbuchtungen (8, 9) so positioniert und konfiguriert sind, dass die erste Einbuchtung (8) eines ersten erfindungsgemäßen Bechers (1) mit der zweiten Einbuchtung (16) eines zweiten, identischen erfindungsgemäßen Bechers (14) in Eingriff kommt, um axialer Relativbewegung der Becher zu widerstehen, wenn der zweite Becher (14) im ersten Becher (1) verschachtelt ist, **dadurch gekennzeichnet, dass** der Becher so konfiguriert ist, dass die Basis (3) des ersten Bechers (1) nicht an den Boden (20) des zweiten Bechers (14) anstößt, wenn der erste und der zweite Becher verschachtelt sind und ihre Einbuchtungen (8, 16) in Eingriff stehen, wobei der Becher (1) ferner ein ein Zusammenschieben verhandelndes Merkmal in der Form einer unterhalb der zweiten Einbuchtung (9) angeordneten dritten Einbuchtung (10) umfasst, wobei der Abstand zwischen der dritten Einbuchtung (10) und der zweiten Einbuchtung (9) dem Abstand zwischen dem Boden des Bechers und der dritten Einbuchtung (10) im Wesentlichen entspricht, wodurch die dritte Einbuchtung (10) als ein Absatz fungiert, der den Boden (20) des zweiten Bechers (14) stützt, wenn die Becher (1, 14) verschachtelt sind und die erste und die zweite Einbuchtung (8, 16) in Eingriff stehen.
2. Papierbecher (1) nach Anspruch 1, wobei die erste und die zweite Einbuchtung (8, 9) so positioniert und konfiguriert sind, dass die zweite Einbuchtung (16) in einem zweiten Becher (14) in der ersten Einbuchtung (8) in Eingriff steht.

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- tung (8) im ersten Becher (1) verschachtelt ist, wenn der zweite Becher (14) im ersten Becher (1) verschachtelt ist, um axialer Relativbewegung der Becher in beiden axialen Richtungen aus der verschachtelten Position zu widerstehen.
3. Papierbecher (1) nach Anspruch 1, mit der dritten Einbuchtung (10), wobei die zweite und die dritte Einbuchtung (9, 10) so positioniert und konfiguriert sind, dass die dritte Einbuchtung (17) in einem zweiten Becher (14) in der zweiten Einbuchtung (9) im ersten Becher (1) verschachtelt ist, wenn der zweite Becher (14) im ersten Becher (1) verschachtelt ist, um axialer Relativbewegung der Becher in beiden axialen Richtungen aus der verschachtelten Position zu widerstehen.
4. Papierbecher (1) nach einem der vorhergehenden Ansprüche, wobei die Einbuchtungen (8, 9, 10, 16) im Wesentlichen geprägte Bereiche in den röhrenförmigen Körper (2) definierenden Seitenwänden umfassen oder daraus bestehen.
5. Papierbecher (1) nach einem der vorhergehenden Ansprüche, wobei die Einbuchtungen (8, 9, 10, 16) im Wesentlichen durchgehende eingebuchtete Ringe umfassen, die sich um den röhrenförmigen Körper (2) erstrecken.
6. Papierbecher (1) nach einem der vorhergehenden Ansprüche, wobei die zweite Einbuchtung (9) einen vertikalen Abstand zwischen 5 mm und 50 mm von der Basis (3) des Bechers hat.
7. Papierbecher (1) nach einem der vorhergehenden Ansprüche, wobei die erste Einbuchtung einen vertikalen Abstand zwischen 10 mm und 15 mm von der zweiten Einbuchtung hat.
8. Papierbecher nach einem der vorhergehenden Ansprüche, mit einem weiteren ein Zusammenschieben verhindernden Merkmal in der Form eines Einsatzes im Boden des Bechers, wobei ein oberer Rand des Einsatzes über der Basis des Bechers abstandet ist, um an den Boden des nächsten nachfolgenden Bechers anzustoßen, wenn die Becher verschachtelt sind und die erste und die zweite Einbuchtung in Eingriff stehen.
9. Papierbecher (1) nach Anspruch 8, wobei der Einsatz ein untertassenförmiger Einsatz mit einer Basis ist, die an die Basis des Bechers anstößt, und Seitenwänden, die innen an die Seitenwand des Bechers anstoßen, wobei der obere Rand an der Oberseite der Seitenwände der Untertasse angeordnet ist.
10. Stapel aus mindestens zwei Papierbechern (1, 14)

nach einem der Ansprüche 1 bis 9, wobei die erste und die zweite Einbuchtung (8, 9, 16) jedes benachbarten Becherpaars im Stapel in Eingriff stehen und wobei eine Portion (18) einer Getränkzubereitungszutat zwischen den Basen (3) jedes benachbarten Becherpaars im Stapel gelagert ist.

11. Stapel nach Anspruch 10, wobei der Stapel in einem sauerstoff- und feuchtigkeitsundurchlässigen Behälter verpackt ist.
12. Verfahren zur Herstellung eines Papierbechers (1) nach einem der Ansprüche 1 bis 9 mit folgenden Schritten: Bilden einer bogenförmigen Vorform aus flächigem Papiermaterial mit einem ersten und einem zweiten geraden Rand und einem ersten und einem zweiten gebogenen Rand, wobei die Vorform mit zwei oder mehr bogenförmigen Prägelinien geprägt wird, die sich im Wesentlichen senkrecht zum Krümmungsradius der gebogenen Ränder erstrecken, Biegen der Vorform zu einer sich verjüngenden Röhre und Befestigen der geraden Ränder aneinander zum Bilden einer sich verjüngenden Röhre mit sich um die Röhre erstreckenden Prägeringen und Befestigen einer Basis (3) in das schmale Ende der Röhre.

Revendications

1. Gobelet en papier (1) pour un système de distribution de boissons dans des gobelets, le gobelet comprenant : un corps tubulaire conique (2) ayant une extrémité supérieure large qui est ouverte et une extrémité inférieure étroite qui est fermée de manière étanche aux liquides par une feuille de base (3) s'étendant transversalement en travers du corps tubulaire, le gobelet comprenant en outre : une première indentation (8) dans la paroi latérale en un premier emplacement au-dessus de la base (3) du gobelet, et une deuxième indentation (9) dans la paroi latérale en un deuxième emplacement au-dessus de la base (3) du gobelet, les indentations (8, 9) étant positionnées et configurées de telle sorte que la première indentation (8) d'un premier gobelet (1) selon l'invention s'engage avec la deuxième indentation (16) d'un deuxième gobelet identique (14) selon l'invention de manière à résister à un mouvement axial des gobelets lorsque le deuxième gobelet (14) est emboîté dans le premier gobelet (1), **caractérisé en ce que** le gobelet est configuré de telle sorte que lorsque ledits premier et deuxième gobelets sont emboîtés avec les indentations (8, 16) engagées, la base (3) du premier gobelet (1) ne touche pas le fond (20) du deuxième gobelet (14), et ledit gobelet (1) comprend en outre un élément anti-télescopage en forme de troisième indentation (10) située en dessous de la deuxième indentation (9), l'espacement

- entre la troisième indentation (10) et la deuxième indentation (9) étant substantiellement identique à l'espacement entre le fond du gobelet et la troisième indentation (10), la troisième indentation (10) fonctionnant comme un rebord qui supporte le fond (20) du deuxième gobelet (14) lorsque les gobelets (1, 14) sont emboîtés avec la première et la deuxième indentation (8, 16) engagées.
2. Gobelet en papier (1) selon la revendication 1, dans lequel les première et deuxième indentations (8, 9) sont positionnées et configurées de telle sorte que la deuxième indentation (16) dans un deuxième gobelet (14) s'emboîte avec la première indentation (8) dans le premier gobelet (1) lorsque le deuxième gobelet (14) est emboîté dans le premier gobelet (1) de manière à résister à un mouvement axial relatif des gobelets dans les deux directions axiales depuis la position emboîtée.
3. Gobelet en papier (1) selon la revendication 1, comprenant ladite troisième indentation (10), lesdites deuxième et troisième indentations (9, 10) étant positionnées et configurées de manière à ce que la troisième indentation (17) dans un deuxième gobelet (14) s'emboîte avec la deuxième indentation (9) dans le premier gobelet (1) lorsque le deuxième gobelet (14) est emboîté dans le premier gobelet (1) de manière à résister à un mouvement axial relatif des gobelets dans les deux directions axiales depuis la position emboîtée.
4. Gobelet en papier (1) selon l'une quelconque des revendications précédentes, dans lequel les indentations (8, 9, 10, 16) comprennent ou sont constituées essentiellement de régions en relief dans les parois latérales définissant le corps tubulaire (2).
5. Gobelet en papier (1) selon l'une quelconque des revendications précédentes, dans lequel les indentations (8, 9, 10, 16) comprennent des anneaux en relief substantiellement continus s'étendant tout autour du corps tubulaire (2).
6. Gobelet en papier (1) selon l'une quelconque des revendications précédentes, dans lequel la deuxième indentation (9) est espacée de la base (3) du gobelet d'une distance verticale de 5 mm à 50 mm.
7. Gobelet en papier (1) selon l'une quelconque des revendications précédentes, dans lequel la première indentation est espacée de la deuxième indentation d'une distance verticale de 10 mm à 15 mm.
8. Gobelet en papier selon l'une quelconque des revendications précédentes, comprenant en outre un élément anti-télescopage sous forme d'insert dans le fond du gobelet, un bord supérieur de l'insert étant
- espacé au dessus de la base du gobelet de manière à buter contre le fond du gobelet suivant lorsque les gobelets sont emboîtés avec les première et deuxième indentations engagées.
9. Gobelet en papier (1) selon la revendication 8, dans lequel l'insert est un insert en forme de soucoupe ayant une base qui bute contre la base du gobelet et des parois latérales qui butent contre l'intérieur de la paroi latérale du gobelet, ledit bord supérieur étant situé au niveau du haut des parois latérales de la soucoupe.
10. Empilement d'au moins deux gobelets en papier (1, 14) selon l'une quelconque des revendications 1 à 9, dans lequel les première et deuxième indentations (8, 9, 16) de chaque paire adjacente de gobelets dans l'empilement sont engagées, et dans lequel une portion (18) d'un ingrédient de préparation de boisson est stocké entre les bases (3) de chaque paire adjacente de gobelets dans l'empilement.
11. Empilement selon la revendication 10, dans lequel l'empilement est emballé dans un récipient imperméable à l'oxygène et à l'humidité.
12. Procédé de fabrication d'un gobelet en papier (1) selon l'une quelconque des revendications 1 à 9, comprenant les étapes consistant à : former une préforme courbe en un matériau en feuille de papier ayant des premier et deuxième bords droits et des premier et deuxième bords courbes, la préforme étant mise en relief avec deux ou plusieurs lignes courbes en relief s'étendant substantiellement perpendiculairement au rayon de courbure des bords courbes, courber la préforme en forme de tube conique et fixer les bords droits l'un à l'autre afin de former un tube conique ayant des anneaux en relief s'étendant autour du tube, et fixer une base (3) dans l'extrémité étroite du tube.

FIG. 1

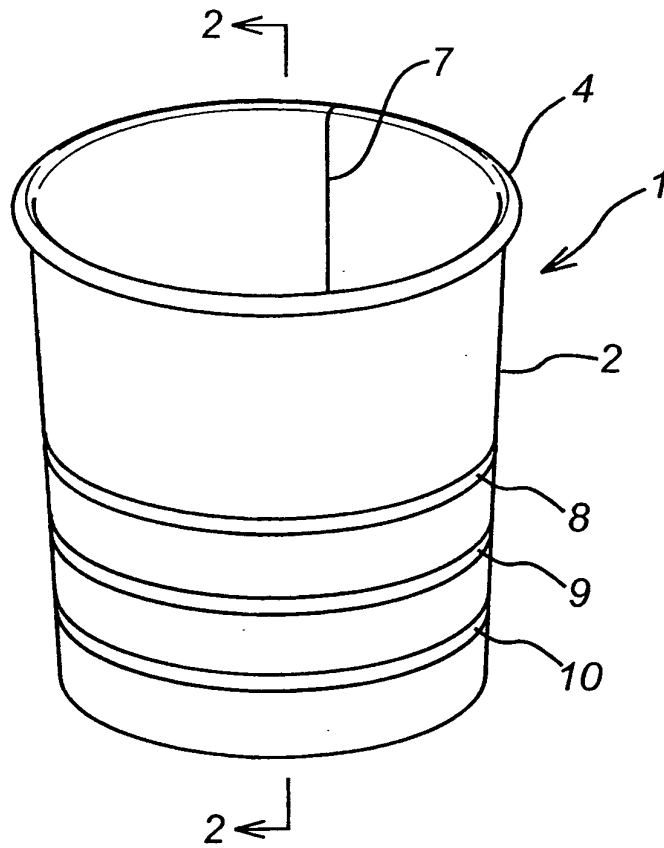


FIG. 2

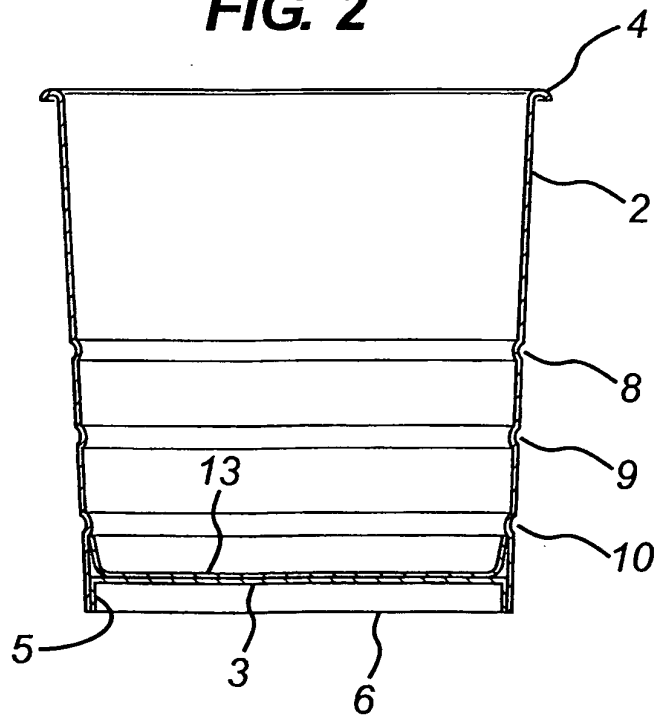


FIG. 3

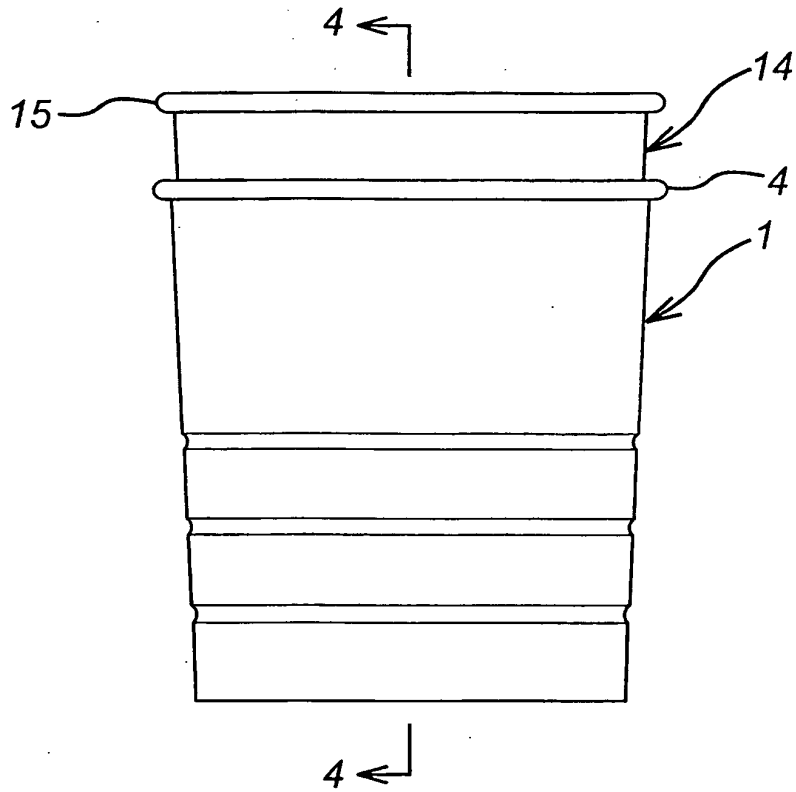
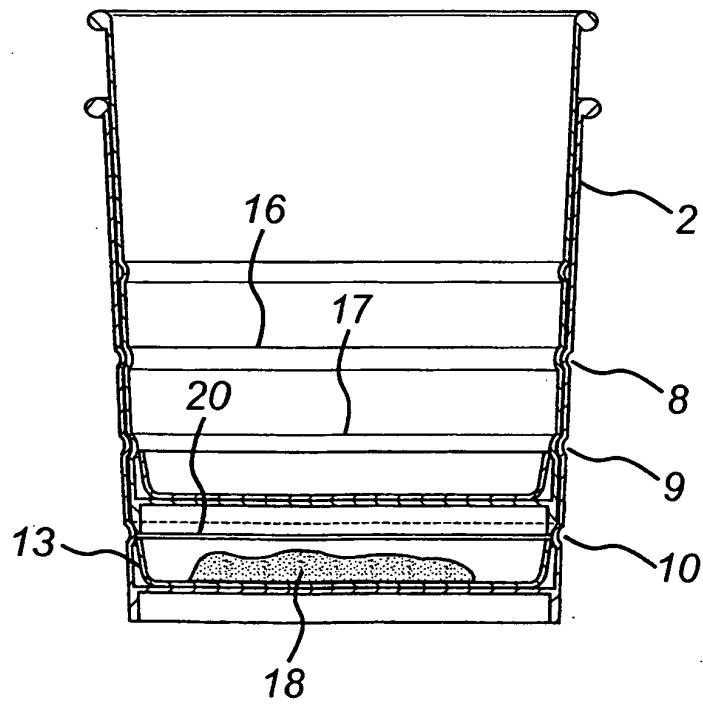


FIG. 4



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- GB 2128468 A [0004]
- GB 1525132 A [0004]
- US 3227273 A [0006] [0007]
- GB 2055038 A [0007]
- US 3526316 A [0008] [0022] [0041]
- EP 1227042 A [0009] [0028]
- FR 2171306 A [0010]
- US 3471075 A [0011]
- US 20020130170 A [0012]
- GB 2073581 A [0013]
- WO 2004074111 A [0014]