May 5, 1959 M. COHEN 2,885,134

STACKABLE DRINKING VESSELS AND STACK THEREOF

Filed Sept. 12, 1957

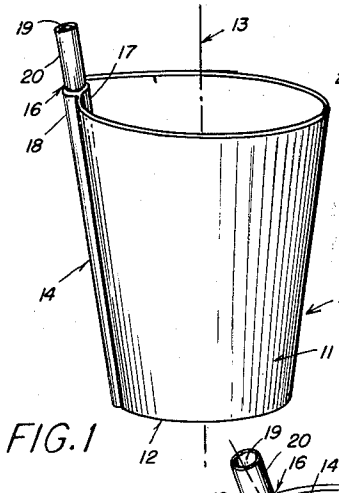


FIG. 1

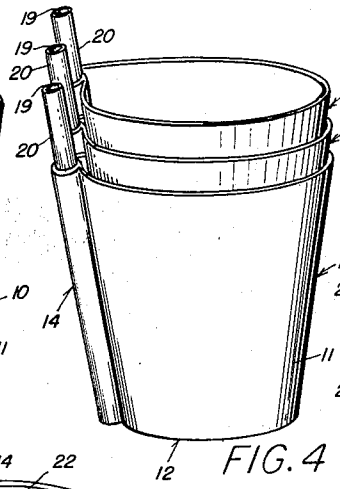
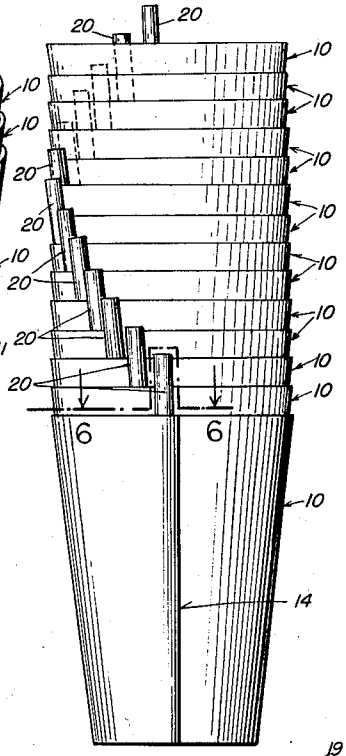


FIG. 4

FIG. 5



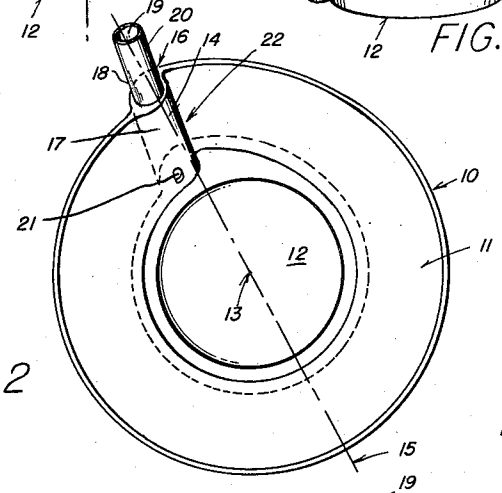


FIG. 2

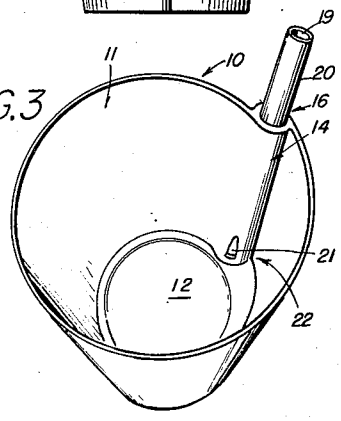


FIG. 3

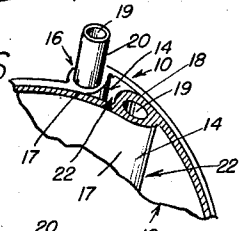


FIG. 6

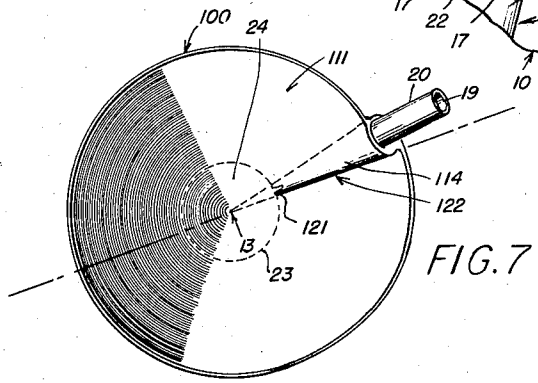


FIG. 7

United States Patent Office

2,885,134

Patented May 5, 1959

2,885,134

STACKABLE DRINKING VESSELS AND STACK THEREOF

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Application September 12, 1957, Serial No. 683,589

6 Claims. (Cl. 229—1.5)

The present invention relates to drinking vessels of the type permanently equipped with an outlet duct, such as a sipping or suction tube to facilitate withdrawal of liquid contents, and it is an improvement upon the drinking cup of my prior Patent No. 2,487,100 of November 8, 1949.

A general object of the present invention is to provide such a drinking vessel which has its outlet duct or suction tube so arranged at one portion of the sidewall as to permit ready and secure stacking, one within the other, without undue relative interference due to the presence of the ducts or tubes.

A more specific object of the invention is to provide such a vessel or open-mouth cup with a flared or tapered sidewall having an upwardly-extending radial offset that effectively defines a corner with which its suction tube structure is associated, with the offset corner of one cup efficiently providing nesting space for the offset corner and associated tube of a like cup nested therein.

Another object of the present invention is to provide a stack of such cups which snugly and securely seat one within another and with the offset corner and associated outlet tube of each successive cup being circumferentially advanced to a position beyond the position of this structure of the preceding cup in which it is nested, such efficient stacking facilitating the machine vending of such cups and their use in machines which vend potable liquids.

A further object of the invention is to provide a structural embodiment of the drinking vessel which may be readily and economically constructed on a mass production basis and which permits efficient use thereof.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawing, in which:

Fig. 1 is an elevational perspective to reduced scale of a practical embodiment of the drinking vessel of the present invention;

Fig. 2 is a top plane view to about full scale of one size of the vessel structure shown in Fig. 1;

Fig. 3 is another perspective view of the vessel of Fig. 1, as viewed when looking down thereinto from an angle;

Fig. 4 is an elevational perspective similar to Fig. 1 of a stack of a plurality of this particular cup structure;

Fig. 5 is a side elevational view of another stack of a larger number of the Figs. 1 to 4 inclusive cups, illustrating the relative circumferentially advanced positions of the suction tubes thereof dictated by the construction of the cups;

Fig. 6 is a fragmentary sectional perspective, with

parts broken away, taken substantially on line 6—6 of Fig. 5; and

Fig. 7 is a top plan view of a conical embodiment of the cup structure, depicting a closer approach to the basic geometrical theory of the structural feature which provides the advantages of the present invention.

Referring to the drawing, in which like numerals identify similar parts throughout, it will be seen that the present invention is concerned with a stackable drinking vessel or cup which may be formed from a variety of materials. The sidewall of the drinking vessel or cup is formed of sheet-like stock and thus the cup may be made from a foldable blank of sheet material suitably shaped to provide the finished structure, such as waterproof paper and the like, or the vessel or cup may be a unitary structure having sheet-like walls suitably molded from such plastic material as will not contaminate potable drinks which are to be the contents of such cups to be withdrawn therefrom by a suction or sipping tube or duct constituting a part of the vessel or cup, such as relatively flexible and elastic polyethylene or somewhat rigid polystyrene. The stackable drinking vessel or cup of the present invention comprises a curved upwardly-extending sidewall of such sheet stock closed off at the bottom and arranged about a vertical central axis. An upwardly-extending radial offset is provided in the sidewall to define a corner arranged generally in a plane which includes the central axis of the vessel or cup as a line element. The vessel or cup is also provided with an upwardly-extending tubular outlet duct secured to the sidewall in this offset corner and the duct has an inlet opening in its lower portion in the vicinity of the bottom of the drinking vessel or cup and an outlet opening in its upper portion in the vicinity of the top of the vessel or cup.

An embodiment of the present invention is illustrated by way of example in Figs. 1 to 6 inclusive in the form of an integrally molded structure **10** formed of suitable plastic material, e.g. polyethylene. The stackable drinking cup **10** has an upwardly-extending and flared sidewall **11** of the sheet-like polyethylene stock closed off at the bottom, preferably by a transverse bottom **12** connected to the lower portion of the sidewall, preferably by being molded integral therewith. While the flared or tapered sidewall **11** is in the broadest sense substantially circular in transverse section, it is more particularly arranged generally in a spiral about the central vertical axis **13** of the cup, indicated by a dot-dash line in Fig. 1, so that portions of successive turns of spiralled sidewall sheet-like stock are brought together in a radial offset **14** arranged upwardly generally in the direction of a plane, indicated by dot-dash line **15** in Fig. 2, which includes the central vertical axis **13** as a line element. The radial offset **14** is of a structure to provide a tubular outlet duct **16** between the portion **17** of the inner face of the sidewall **11** which there is radially nearest the axis **13** and the portion **18** of the outer face of the sidewall which there is farthest radially from this axis. Since in the preferred form the tubular outlet duct is molded integral with the sidewall at the connecting radial offset, the latter has appreciable circumferential width and an outlet passage **19** extends therethrough, as will be best understood from Fig. 6. In order to facilitate engagement of the drinker's lips with the outlet end of the duct, the latter preferably is provided with an integral extension **20** through which the passage **19** extends to a top outlet opening, either in the immediate vicinity of the open top of the cup or preferably in the general vicinity thereof at an elevated point, as shown. The outlet passage **19** of the tubular outlet duct **16** has communication with the interior of the cup in the vicinity of the bottom thereof by way of an inlet opening **21**, so that when suction is

applied to the outlet opening at the top end of the duct extension 20 any liquid within the cup will be withdrawn up through the outlet passage.

The provision of the tubular outlet duct 16 as the hollow radial offset 14 which defines the adjacent offset corner 22 is the feature of importance of the present invention which permits ready and secure stacking of a plurality of such cups. Stacks of such nested drinking cups are illustrated in Figs. 4 and 5 and, as will be seen therefrom, the corner 22 defined by offset 14 of a preceding cup provides space for accommodating the offset of the next succeeding cup nested therein, so that the offsets of the cups are successively advanced circularly about the central vertical axes of the cups which are in general coincidence. This will be understood from the staggered and spiral arrangement of the tubular outlet duct extensions 20—20 indicated in Fig. 5, each of which is circularly advanced to a position beyond the position of the immediately preceding duct and the offset defined thereat. Consequently, there is appreciable contact between the inside face of the sidewall of a preceding cup and the outside face of the sidewall of the next succeeding cup nested therein, so that there will be no relative rocking between the cups as may be the case where the suction tube is located as a tubular arrangement projecting inwardly from the inside face of a cup wall characteristic of prior constructions. Such secure nesting permits the cups of the present invention to be stacked in vending machines in a secure and stable manner which facilitates their vending while avoiding difficulties in the vending operation that may result from otherwise insecure and unstable nesting. Such cups are thus well adapted to use in coin machines for vending potable liquids which successively drop the cups to a receiving position, one at a time, there to receive the purchased drink.

It will be noted from the top plan view in Fig. 2, depicting an embodiment of the present invention which has been successfully produced in polyethylene stock, that the outlet duct offset 14 is not precisely aligned with the plane 15 which includes the central vertical axis 13 as a line element. This illustrates that with respect to the theoretically correct position and orientation, as well as to the ideal shaping of the outlet duct offset 14 referred to hereinafter, practical embodiments of the present invention may utilize to advantage variations thereof. The offset 14 has a circumferential or circular width at the bottom of the cup substantially equal to its width at the top of the cup and this is for the purpose of assuring that the outlet passage 19 is of considerable cross section throughout its length to avoid necessity of employing appreciable suction to withdraw liquid from the cup at a desirable rate, and for a similar reason it may be desired that the inner opening 21 also be of appreciable size. It will be appreciated that this considerable circumferential width of the offset 14 of each cup 10 in the vicinity of the bottom 12 of the latter dictates the circular advance of one cup relative to the other in the nesting thereof due to the flaring or tapering of the cups. As a result, the upper ends of the tubular outlet ducts will be spaced circularly a considerable distance, as will be noted from Figs. 5 and 6, but this need not interfere with their proper nesting and handling in stacks, even though the duct or tube extensions 20—20 may be of appreciable length, since the rate of build-up of the stack is relatively greater than the rate of circular offsetting of the tubes. The spiral arrangement of the sidewall 11 of each cup also assures that the nesting corner 22 of each cup is of appreciable circular extent so as to provide such spacing freedom.

Fig. 7 illustrates another embodiment of the invention in which the cup body 100 is in the form of a cone with the tapered conical sidewall 111 having a tapered offset 114. It will be noted from Fig. 7 that the line elements of the longitudinal surfaces of the tapered offset 114 intersect at the tip of the conical cup 100 from which its central vertical axis 13 extends. As a result a plurality of the conical cups 100 may be snugly nested with the offset-defined corner 122 of each snugly receiving therein the passaged offset 114 of the cup nested therein. As a consequence, the outlet extensions 20—20 of such nested conical cups may be more closely spaced circularly than those of an embodiment of the type illustrated in Figs. 1 to 6 inclusive. However, such tapering of the passage offset 114 requires that it have an inlet opening at a point appreciably above the bottom of the cup, such as is illustrated at 121 in Fig. 7, which may be attained by terminating the offset at that point. Consequently, the outlet passage 19 does not communicate with the conical space in the bottom of the conical cup 100 below the dotted line 23, in which a quantity of liquid could remain to the annoyance of the drinker. Of course, the conical bottom or tip 24 could be eliminated by substituting a transverse bottom therefor in the plane of the dotted circle 23, but the problem of providing a sufficiently large inlet opening and outlet passage in its lower portion would remain in a tapered offset structure like that illustrated at 114. Thus, an embodiment of the present invention of the type illustrated in Figs. 1 to 6 inclusive may be more satisfactory from a customer's point of view, particularly since the advantages of the offset feature of the present invention can be obtained therein to a practical degree even though there is some variation in shape from the ideal dictated by the basic geometrical theory which permits the closest nesting possible when the cup is of the Fig. 7 type. It will also be understood that the successive cups may have vertical sidewalls if they are graduated in size, the offset feature of the present invention permitting proper secure nesting thereof, but if cups of equal capacity are preferred they should be of the flared sidewall or tapered styles illustrated in the drawing.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above construction without departing from the score of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A stackable drinking vessel comprising an upwardly-extending and flared sidewall of sheet-like stock closed off at the bottom and arranged generally in a spiral about a central vertical axis, said sidewall having a radial offset arranged upwardly generally in the direction of a plane which includes said axis as a line element, and a tubular outlet duct located at said radial offset between the portion of the inner face of said sidewall which there is radially nearest said axis and the portion of the outer face of said sidewall which there is farthest radially from said axis, said duct having a bottom inlet opening and a top outlet opening.

2. A stackable drinking vessel comprising a tapered upstanding sidewall of sheet-like stock arranged generally in a spiral about a vertical central axis, a bottom closing off the lower portion of said spiralled sidewall, and an upwardly-extending tubular outlet duct arranged generally in the direction of a plane which includes said axis as a line element and between the portion of the inner face of said sidewall which there is radially nearest said axis and the portion of the outer face of said sidewall which there is farthest radially from said axis, said duct defining a radial outward offset in said sidewall and an unobstructed longitudinal corner in the inside

face of the latter with the radial depth of said corner being sufficient to permit appreciable nesting therein of like radial outward offset and associated tubular outlet duct of a similar vessel when nested in said vessel, thereby permitting free stacking of a plurality of said vessels with the offsets thereof successively advanced circularly about said axis, said duct having an inlet opening in the vicinity of said bottom and an outlet opening in the vicinity of the top of said vessel.

3. A stack of nested drinking cups each comprising a tapered upstanding sidewall of sheet-like stock arranged generally in a spiral about a vertical central axis, each of said cups having an open top and a closing bottom, each cup having an upwardly-extending radial outward offset in its sidewall arranged generally in the direction of a plane which includes the central axis of this cup as a line element, the offset portion of the wall of each cup having an upwardly extending outlet passage therein provided with an inlet opening in the vicinity of the bottom of this cup and an outlet opening in the vicinity of the top of this cup and defining thereadjacent in the inside face of said sidewall an unobstructed longitudinal corner, each successive cup being nested in the next preceding cup with the offset thereof circularly advanced to a position beyond the position of the offset of the preceding cup and received in the longitudinal corner of the latter.

4. A stack of nested drinking cups each comprising a tapered upstanding sidewall of sheet-like stock arranged generally in a spiral about a vertical central axis, each of said cups having an open top and a transverse closing bottom connected to the lower portion of said sidewall, each cup having an upwardly-extending radial outward offset in its sidewall of appreciable circumferential width and being hollow to provide an upwardly extending outlet passage communicating with the interior of the cup in the vicinity of its bottom and terminating in a top outlet opening in the vicinity of the cup top, the offset portion of each cup sidewall defining thereadjacent in the inside face of said sidewall an unobstructed longitudinal corner, each successive cup being nested in the next preceding cup with the hollow offset thereof circularly advanced to a position beyond and adjacent to the position of the offset of the preceding cup and received in the longitudinal corner of the latter.

5. A stackable plastic drinking cup comprising a tapered upstanding sidewall of sheet-like plastic arranged generally in a spiral about a vertical central axis, an integral plastic bottom closing off the lower portion of said spiralled sidewall, portions of successive turns of said spiralled sidewall being connected together in an integral radial outward offset extending upwardly generally in the direction of a plane which includes said axis as a line element, said offset having appreciable circumferential width and being hollow to provide an upwardly extending suction outlet passage communicating with the interior of the cup in the vicinity of its bottom and terminating in a top outlet opening above the top of the cup and defining thereadjacent in the inside face of said sidewall an unobstructed longitudinal corner to receive the like radial outward offset of another such cup when nested in said cup.

6. A stackable drinking vessel comprising a curved upwardly-extending side wall of sheet-like stock closed off at the bottom, an upwardly-extending radial outward offset substantially coextensive with the height of the cup and with the portion of the side wall adjacent one circumferential side of said radial outward offset being connected to the latter where it is radially nearest the center of said cup and the portion of the side wall adjacent the other circumferential side of said radial offset being connected thereto where it is radially farthest from the center of said cup with the latter side wall portion and the offset together defining an unobstructed longitudinal corner in the inside face of said side wall, and an upwardly-extending tubular outlet duct secured to said side wall and incorporated in said offset with maintenance of the unobstructed corner, said duct having an inlet opening in the general vicinity of the bottom of the cup and an outlet opening in its upper portion, said corner being of such radial depth with an appreciable longitudinal portion thereof being free as to permit appreciable nesting therein of a like radial outward offset and incorporated tubular outlet duct of a similar vessel when stacked in said vessel.

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