Sept. 28, 1965 B. EDWARDS 3,208,631

NESTABLE CUP

Original Filed Oct. 29, 1958

Fig. 1.

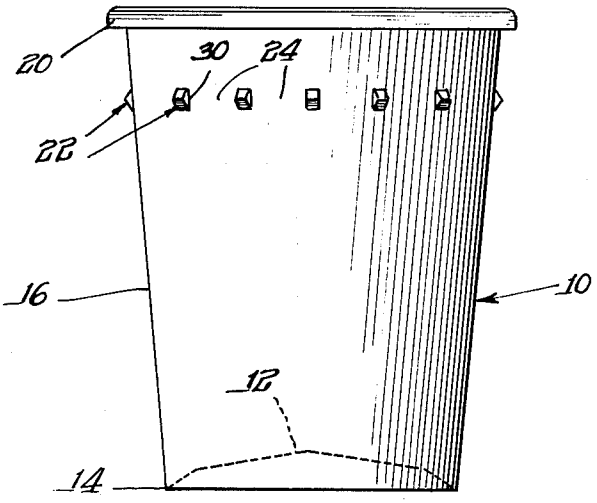
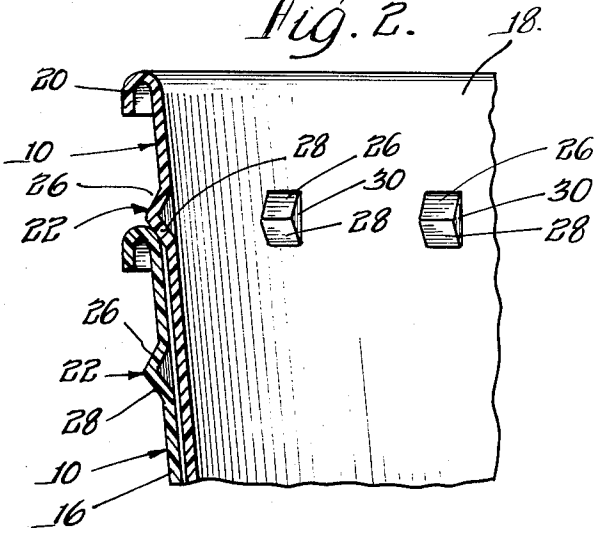


Fig. 2.



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3,208,631

NESTABLE CUP

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Continuation of application Ser. No. 244,321, Dec. 13, 1962, which is a division of application Ser. No. 769,057, Oct. 29, 1958, now Patent No. 3,091,360, dated May 28, 1963. Divided and this application May 21, 1964, Ser. No. 370,398

2 Claims. (Cl. 220—97)

The present application comprises a continuation of my co-pending application Serial No. 244,321, filed December 13, 1962, now abandoned, which was a division of my then co-pending application Serial No. 769,057, filed October 29, 1958, now Patent No. 3,091,360, the latter being a continuation-in-part of my then co-pending application Serial No. 699,678, filed November 29, 1957, now Patent No. 2,905,350; all entitled "Nestable Cup."

This invention is concerned with the art of beverage containers, and most particularly with a cup of the expendable or throw-away variety.

As is well known, there are expendable cups made of impregnated paper, and even some of plastic. Such cups are used on picnics and the like, and are widely used in beverage vending machines, such as coffee machines and soft drink machines. As will be appreciated, economy of storage space dictates that a plurality of cups, in a vending machine, for example, must be stored in a tubular magazine with the cups telescoped within one another. When a beverage is to be dispensed, the bottom cup is dropped from the stack in the magazine into position to receive the beverage.

In the past, it has often been found that the bottom cup would not drop satisfactorily. It has been quite easy for the cups to become wedged together to the extent that the rather light weight of the bottom cup is insufficient to cause it to drop from the stack. Furthermore, the cups have necessarily hugged one another tightly, and the introduction of air between the bottom cup and the next adjacent cup has accordingly been slow, whereby air pressure tends to hold the bottom cup on the bottom of the stack. As a result, the bottom cup drops too slowly, or not at all.

Accordingly, it is an object of this invention to provide a cup, particularly a throw-away cup, which is so configured that a plurality of such cups can be stacked in telescopic relation without wedging together.

It is an object of this invention to provide a thin-wall plastic cup having means providing a protuberant ring in the sidewall of the cup engageable with the upper rim of a subjacent cup for stacking a plurality of such cups in nested relation.

It is a further object of this invention to provide a thin-wall plastic cup having a stacking ring in the form of a plurality of circumferentially spaced nibs engageable with the rim of a subjacent cup in telescoped, stacked relation therewith, the spacing between the nibs providing air passages to insure against the cups being held together by air pressure.

It is a further object of this invention to provide a thin-wall plastic cup as set forth above wherein the means engageable with the rim of a subjacent cup forms a camming engagement therewith, the camming engagement and the inherent resiliency of the plastic material affording axial resiliency to a stack of such cups, whereby to avoid splitting open of a paper box or carton when a stack of such cups in such a carton is dropped.

Other and further objects and advantages of the present invention will be apparent from the following description when taken in connection with accompanying drawings wherein:

FIG. 1 is a side view of a cup constructed in accordance with the principles of this invention; and

FIG. 2 is a fragmentary axial sectional view on an enlarged scale showing a pair of the cups of FIG. 1 stacked together in telescoped relation.

The cup as hereinafter described in detail is made of plastic, preferably of high impact polystyrene. Such cups have marked advantages over paper cups which have been impregnated or coated with wax. They present a better feel and taste to the lips, they do not become soggy in use, and they form a substantially perfect vapor barrier so that no moisture condenses on a cool table beneath a cup when the cup contains hot coffee or the like.

The cup is molded or formed from sheet plastic material and is designated generally by the numeral **10**. The cup comprises a preferably indented bottom **12** merging at a relatively sharp angled bottom corner **14** with a sidewall **16** integral therewith. The sidewall **16** is frusto-conical in configuration, tapering out from a minimum diameter at the bottom corner **14** to an open upper end **18** defined by a rolled-over rim **20**. The sidewall is shown as being of smooth, uniform taper. However, it will be understood that the sidewall could have a finger gripping ring section therein as disclosed and claimed in my Patent 2,905,350.

Adjacent the top or open upper end, and spaced downwards a relatively short distance therefrom, there is provided an annular series of circumferentially spaced nibs **22**. The nibs are arcuately spaced apart as indicated at **24**. The nibs are more or less symmetrical about a horizontal plane, being tapered on the top as indicated at **26**, and on the bottom as indicated at **28**. The lateral walls **30** of the nibs conveniently are substantially perpendicular to the adjacent portions of the sidewall **16**.

The particular symmetry just described is not necessarily essential. The important thing is that the bottom or under portions of the nibs are tapered outwardly at an angle greater than the taper of the sidewall **16**. The under portions **28** of the nibs **22** of any given cup engage against the rolled rim **20** over a corresponding subjacent cup, the engagement, as readily seen in FIG. 2, being a camming engagement. The nibs bend the engaged portions of the outer cups outwardly, and conversely cause the inner cups to deflect inwardly in the vicinity of the nibs. There will obviously be a certain amount of deformation in the arcuate areas between the nib engagement, and in particular, an outer cup will pull toward a chordal position between the positions of engagement.

It will be understood that the camming action combined with the inherent resiliency of the plastic imparts a spring action resulting in a resilient stack of cups. It will be understood that a rigid stack of cups is likely to split a shipping container of paesteboard or the like, if the cups are dropped. Furthermore, the resiliency saves wear and tear on the vending machine in which the cups might be used.

The cup as shown herein is preferably made from sheet plastic stock. Thus, the protuberances are of concave-convex nature in order that they might be formed integral with the sidewall of the cup and remain of substantially the same thickness as the remainder of the sidewall. The protuberances must not be allowed to collapse or deform too far in the concave direction under load, and it will be apparent that the protuberance tapered surfaces which do not engage an adjacent cup edge provides a strutting action coacting with the engaging surfaces of the protuberances to prevent such collapse. As noted heretofore, exact axial symmetry of the protuberances is not essential, but substantial axial symmetry is one desired feature of the invention.

The rolled upper rim of the cup is important from several aspects. In the preferred embodiment it provides the oblique surface generally complementary to the protuberance oblique surfaces for camming engagement therewith. However, it may be noted that although this is the preferred or illustrative embodiment, a reversal of parts is not to be ruled out. Secondly, the rolled rim is important in separating cups one-by-one from a stack of telescoped cups, as in a vending machine. A straight-up edge in such a thin-wall cup as herein disclosed would give no surface for engagement by a cup separating mechanism as in a vending machine. Such a straight-up edge also would be structurally weak and could cut the lip of one drinking therefrom.

Furthermore, although a certain amount of deformation of the cup edge by the protuberances may be desirable, there must be radial reinforcement thereof to prevent undue flexing that could allow the protuberances completely to pass the edge, whereupon the cups would jam together. Such undue deformation is further avoided by controlling the spacing between protuberances. Thus, as in the preferred example illustated, there is at least a portion of a protuberance for not over substantially every thirty degrees of arc circumferentially of the cup.

It is to be understood that the specific example of the invention heretofore shown and described is for illustrative purposes only. Various changes in structure will be apparent to those skilled in the art, and will be understood as forming a part of the present invention insofar as they fall within the spirit and scope of the appended claims.

The invention is claimed as follows:

1. A thin-wall plastic cup of integral one-piece construction and of a size adapted to be grasped and lifted readily in one hand, comprising a bottom, and a sidewall tapering upwardly and outwardly therefrom to an open upper end with a rolled over rim, said sidewall being substantially symmetrical about the longitudinal axis of said cup and integrally joined to said bottom at a bottom edge and having a top edge, said cup being provided with a circumferentially extending abutment surface at one of its edges, and a series of integral protuberances arranged in circumferential array in the vicinity of said abutment surface, each of said protuberances being in the form of a pair of converging, oppositely disposed, and circumferentially spaced thin wall sections formed from the cup sidewall, each of said wall sections being angularly disposed in respect to the cup sidewall and with the circumferential extremities of each of said thin wall sections being joined by end wall sections formed from the cup sidewall, the convergence of said sections presenting a V-shaped configuration terminating in a relatively discrete apex projecting radially from said sidewall and all of said apices being located in circumferential array substantially within a common plane perpendicular to the longitudinal axis of the cup, the upper and lower bounding surfaces of said protuberances diverging from said common plane, the said abutment surface of the cup and said diverging protuberance surfaces of the cup being radially overlapping whereby the abutment surface of one cup cammingly engages the adjacent bounding surface of each protuberance of a like adjacent cup telescoped therewith, the camming engagement and the inherent resiliency of the cup material providing a resilient resistance to prevent jamming together of telescoped cups and providing axial resilience to a stack of telescoped cups.

2. A thin-wall plastic cup as set forth in claim 1 wherein the spaced protuberances project radially outwardly from the cup sidewall and are located in the vicinity of the upper rolled over rim providing said abutment surface.

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