

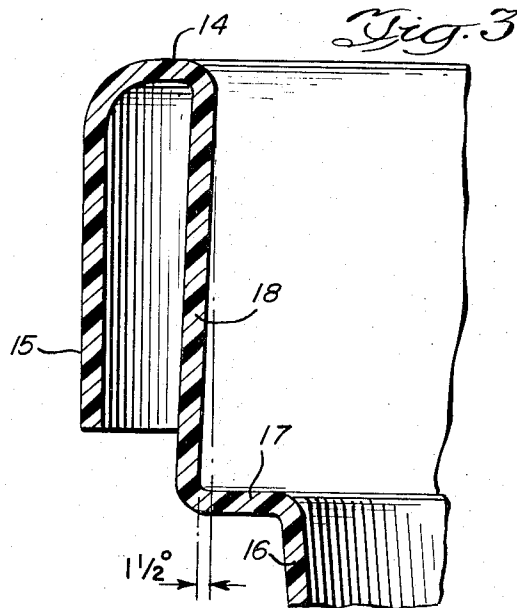
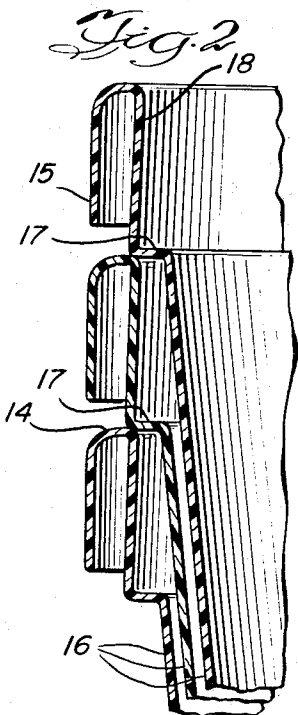
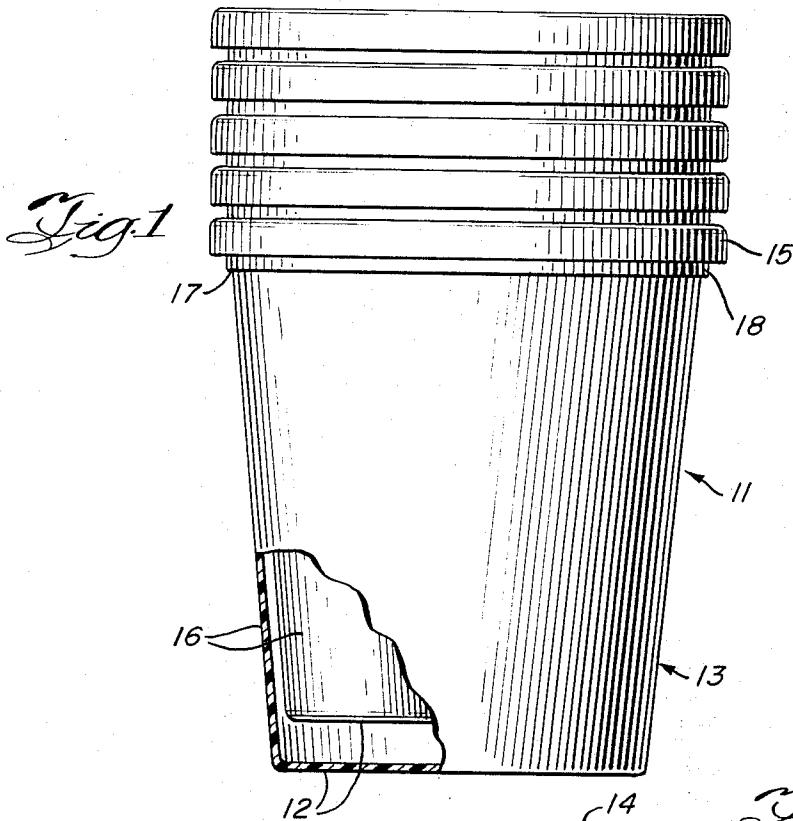
Dec. 19, 1967

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3,358,879

NESTING CONTAINER

Filed Oct. 20, 1965



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3,358,879

NESTING CONTAINER

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Filed Oct. 20, 1965, Ser. No. 498,711

3 Claims. (Cl. 220-97)

ABSTRACT OF THE DISCLOSURE

A one-piece, thin-walled, cup-shaped plastic container having a rim extending outwardly from the upper end of the sidewall to provide a generally horizontal seating surface of greater width than the thickness of the wall section and a generally horizontally extending annular shoulder spaced vertically from said rim by a wall section extending inwardly and upwardly from the outer edge of said shoulder. With this construction, the horizontal shoulder of one container can seat on the horizontally extending rim of another container in which the first container is nested with the sidewalls of the nested containers in spaced apart relation.

This invention relates to a one-piece, thin-walled, cup-shaped plastic container having a tapered sidewall, and is particularly concerned with novel structure that enhances the stacking characteristics of the containers.

In stacking containers of the type with which the present invention is concerned, it is desirable that the containers should nest within one another and that they should not jam together in the stack so as to make separation of adjacent containers difficult. The ease with which a container is separated from a stack is of particular importance when the containers are to be dispensed from a vending machine. It has long been known that air spaces between adjacent nested containers are conducive to easy separation of individual containers. Heretofore, it has been customary to provide such air spaces by embossing either the bottom or the sidewall of the container. In containers having the bottom wall embossed, the bottom wall must be embossed upwardly in order that the containers will remain upright when placed on a flat surface. This type of embossment is not particularly desirable since it creates the impression that the capacity of the container has been reduced. Containers having their sidewalls embossed have a disadvantage in that when axial force is applied to the containers during the stacking operation, the containers may be jammed together making separation difficult.

In accordance with the present invention, the stacking characteristics of the container are enhanced by a novel configuration imparted to the upper portion of the container. The container has an annular rim extending outwardly from the upper end of its sidewall, and an annular shoulder spaced below said rim. The section of the sidewall between the shoulder and the rim is sloped to provide an annular surface whereby the underside of the shoulder of each container will seat upon the rim of a similar container in which it is nested. The surface contact between adjacent stacked containers is in the horizontal plane coincident with the lower surface of the shoulder of one container and the upper surface of the rim of the container in which it is nested, and the area of the surface engagement between adjacent stacked containers is wider than the wall thickness of the containers. The width of the area of surface engagement adjacent containers prevents lateral separation of the engaged portions of the containers because any lateral movement of one container tending to reduce the area of surface en-

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agement at one point increases the area of surface engagement at a diametrically opposite point. The absence of any surface contact between the vertically disposed sidewalls of adjacent nested containers prevents the containers in any nested stack from jamming together under axial pressure.

The container of the present invention also has a vertical flange depending from the outer edge of the rim which serves to reinforce the rim portion. The height of this flange is less than the height of the wall section of the container between the rim and shoulder, with the result that the lower edge of the flange is normally spaced above the rim of the adjacent lower container in a stack of nested containers. The gap between the bottom of the flange of one container and the rim of the adjacent lower container in a stack of nested containers facilitates the manual separation of one container from a stack of nested containers.

The structure by which the above mentioned and other advantages of the invention are attained will be described in the following specification taken in conjunction with the accompanying drawings illustrating a preferred embodiment of the invention, in which:

FIGURE 1 is an elevational view showing a plurality of containers embodying the invention, with the containers stacked in nested relationship and a lower portion of one container broken away;

FIGURE 2 is an enlarged fragmentary sectional view of a plurality of the containers in nested relationship; and

FIGURE 3 is a fragmentary sectional view of a single container on a greatly enlarged scale.

The containers with which the present invention is concerned are of the type intended to be used once and then discarded. They are preferably molded of any suitable plastic material such as, for example, high impact polystyrene.

Referring to the drawings, the container is designated by the reference numeral 11. The container is a one-piece integral structure comprising a bottom wall 12 of any suitable configuration, an upstanding sidewall 13, an annular rim 14 extending outwardly from the upper end of the sidewall, and an annular flange 15 depending from the outer edge of the rim.

The sidewall 13 comprises a lower portion 16, tapered upwardly and outwardly from the outer edge of the bottom wall 12, a substantially horizontal annular shoulder 17 extending outwardly from the upper end of the lower portion 16, and an upper section 18 tapered upwardly and inwardly from the outer edge of the shoulder 17. The taper of wall section 18 is preferably kept as small as possible consistent with the function of the taper. If the angularity of the inward taper of the wall section 18 is too great it will make it difficult to remove the container from the mold in which it is formed. It has been found that a taper of around 1½° from the vertical provides the most satisfactory upper wall structure, although other angular inclinations that do not interfere with the removal of the container from the mold will produce a satisfactory structure.

The purpose of the inward inclination of the taper of the wall section 18 is to provide an annular horizontal seating surface on top of the rim 14 having a width greater than the thickness of the wall section 18, whereby the shoulder 17 cannot be displaced from its seating engagement with the rim. Any lateral movement of one container tending to reduce the area of seating engagement between two nested containers at one section increases the area of seating engagement between the two containers at a diametrically opposite section. The inner diameter of the open upper end of the container is smaller than the inside diameter of the container in the plane coincident with the

upper surface of the shoulder 17 and the minimum inside diameter of the container above the shoulder 17 is greater than the maximum outside diameter of the container below the shoulder. This diametrical relationship between the upper and lower portions of the container permits one container to telescope within an identical container, and causes the outer edge portion of the shoulder 17 of one container to seat upon the inner edge portion of the rim of the adjacent lower container in a stack of containers in nested relationship. The seating engagement of the shoulder of each container in a stack of nested containers with the rim of the adjacent lower container in the stack provides air spaces between the vertical portions of adjacent containers, and prevents any surface engagement between the sidewalls of adjacent containers.

Surface engagement between vertical portions of adjacent containers makes it possible for the containers in any stack to be jammed together under axial pressure, and thus makes it difficult to separate individual containers from the stack. The absence of any surface engagement between vertical surfaces of adjacent containers in a stack facilitates the separation of individual containers from a stack. When one container is nested in a second container, the difference between the height of the wall section 18 and the height of the flange 15 spaces the lower edge of the flange of the first container above the rim of the second container and thereby facilitates manual separation of one container from a stack of nested containers.

Although a preferred embodiment of the invention has been described in considerable detail, it will be understood that the description thereof is intended to be illustrative, rather than restrictive, as many details of structure may be modified or changed without departing from the spirit or scope of the invention. Accordingly, it is not desired to be restricted to the exact structure described.

What is claimed is:

1. A one-piece, thin-walled plastic container comprising a bottom wall, a sidewall extending upwardly and outwardly from said bottom wall, a rim extending outwardly from the upper end of said sidewall, and a flange depending from the outer edge of said rim, said sidewall defining a generally horizontally extending annular shoulder spaced vertically from said rim by a wall section of greater height than the height of said flange, said wall section extending inwardly and upwardly from the outer edge of said shoulder, the inward inclination of said wall section being sufficient to provide an annular horizontal seating surface on the rim of container of greater width than the thickness of said wall section for the generally horizontally extending shoulder of a container nested therein with the sidewalls of said nested containers in spaced apart relation.

2. A one-piece, thin-walled plastic container comprising a bottom wall, a sidewall extending upwardly from said bottom wall to an open upper end, and an annular generally horizontal rim extending outwardly from the upper end of said sidewall, said sidewall comprising a lower portion tapered outwardly from said bottom wall, an upper portion tapered outwardly from said upper end, and a substantially horizontal shoulder portion extending outwardly from the upper end of said lower portion to the lower end of said upper portion, the minimum inside diameter of said container adjacent said rim being smaller than the outside diameter of said shoulder and larger than the maximum outside diameter of said container below said shoulder, whereby said rim provides an annular horizontal seating surface of greater width than the thickness of said sidewall for the substantially horizontal shoulder of a second container and said second container is adapted to nest within said first container with its substantially horizontal shoulder seated on the generally horizontal rim of said first container with its sidewall spaced from the sidewall of said first container.

3. A one-piece, thin-walled plastic container comprising a bottom wall, a sidewall extending upwardly from said bottom wall, and a generally horizontal rim extending outwardly from the upper end of said sidewall, said sidewall comprising a lower portion tapered upwardly and outwardly from said bottom, an upper portion tapered downwardly and outwardly from said rim at an angle of about $1\frac{1}{2}^\circ$ from the vertical, and a substantially horizontal annular shoulder between the lower end of said upper wall portion and the upper end of said upper and lower wall portion, the taper of said upper wall portion providing an annular horizontal seating surface on the rim of said container of greater width than the thickness of said upper wall portions upon which the substantially horizontal shoulder of a second container rests when nested within said first mentioned container with the sidewalls of said nested containers in spaced apart relation.

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