July 26, 1966 P. DAVIS 3,262,626

CUP

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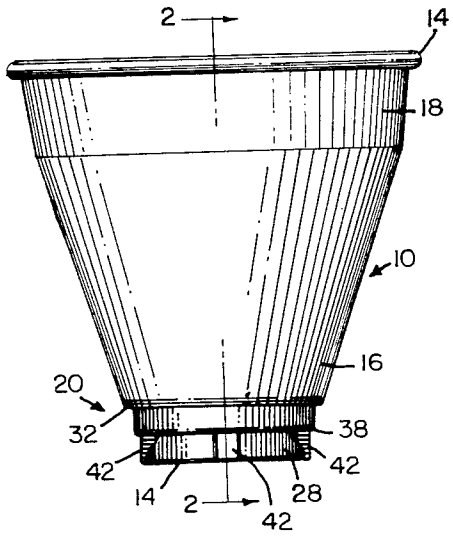


FIG.1

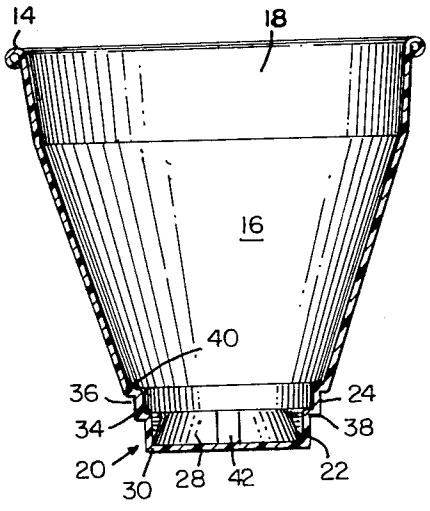


FIG.2

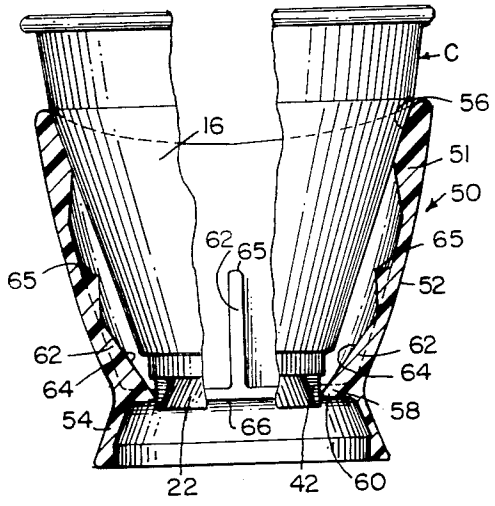


FIG. 3

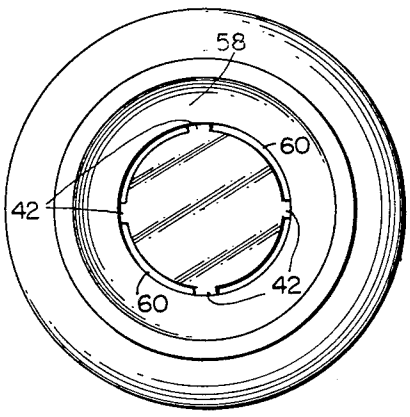


FIG. 3A

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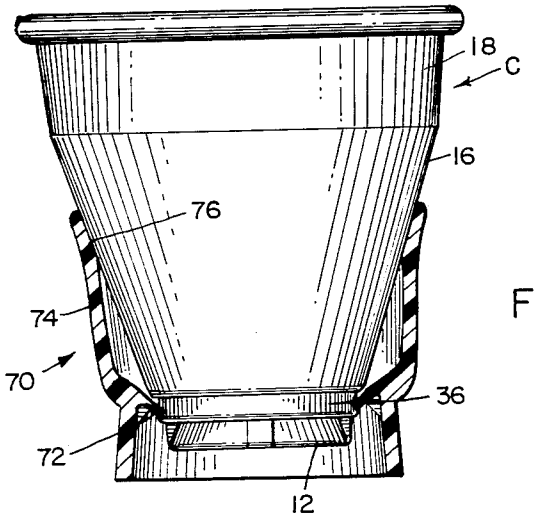


FIG. 4

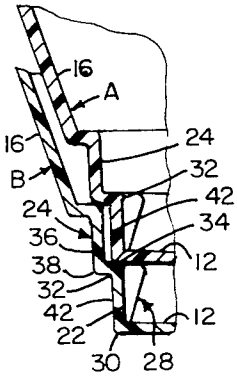


FIG. 6

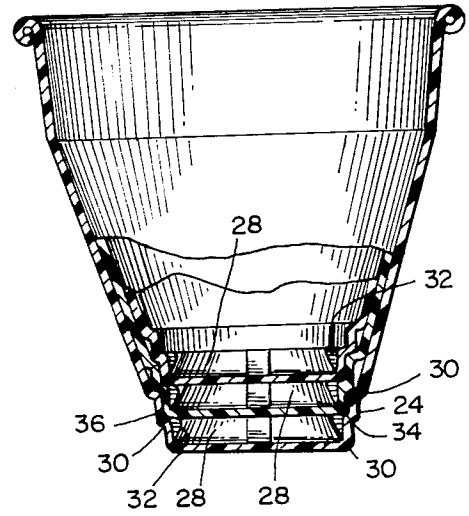


FIG. 5

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United States Patent Office

3,262,626

Patented July 26, 1966

3,262,626

CUP

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Filed Sept. 25, 1963, Ser. No. 311,509
9 Claims. (Cl. 229—1.5)

This invention relates to disposable plastic containers and more particularly comprises a new and improved throw-away cup designed to be used with rigid and reusable cup holders.

At the present time throw-away cups used with permanent cup holders are universally made of paper and therefore necessarily have side walls with a uniform slope throughout their full height. To provide the paper cups with a greater capacity per unit height, the cups are made with flattened bottom walls which require pleating of the paper in some manner if the cups are to be made from a single sheet of stock. The cups are initially formed in the shape of a cone and thereafter they are subjected to a truncating machine which crushes the apexes so as to flatten or otherwise collapse them, and the resulting cup is thus generally frusto-conical in shape. The truncating pressures applied to the cups during their manufacture must be very carefully controlled to avoid tearing the stock, and the paper cups so formed must be coated with wax or other material so that they maintain their shape.

The inability to make the side walls of paper containers with other than a constant slope throughout their height constitutes another serious limitation in the use of paper. Because the side walls of one piece paper containers must have a uniform slope throughout their height, large drinking containers such as those used at soda fountains etc., for the serving of ice cream drinks, have an uncomfortably large mouth, that is the diameter of the larger paper cups at their rim is so large that it is difficult to drink from them in the absence of a straw without spilling the contents.

For a disposable cup to be acceptable to the trade it must be so sized with respect to its holder that it can be readily stripped from the holder after use. If the holder cannot conveniently be freed of the cup many of the advantages which led to the development of throw-away cups and reusable holders are mitigated. To assure easy removal of the paper cups from the rigid holders, manufacturers exercise extreme care in the design and manufacture of the paper cups, particularly because paper when hot or wet may swell and consequently bind in the holder so that the cups are difficult to remove.

All of the foregoing limitations of paper cups are overcome when they are made of plastic. Plastic cups may be easily formed in almost any shape, and the collapsing of certain portions of the cups after being initially formed is avoided. Consequently no pleats are employed to achieve irregular shapes and no special coatings are necessary. Moreover, the plastic containers may have separate side wall portions of different slope so that the side walls at the bottom may flare at a relatively wide angle to achieve a large volume at the bottom, while the upper portion of the side walls may have a smaller angle of flare so that containers of large size need not have extremely wide mouths. Also, while paper may have a tendency to swell when wet and hot, plastic when heated tends to shrink and therefore plastic cups used for hot drinks such as coffee inherently are looser in the holder after use than when first placed in the holder.

One important object of this invention is to avoid in a throw-away cup used with a reusable holder, the limitations of such cups made of paper.

To accomplish the general object set forth above, this invention is embodied in a throw-away container made of plastic. Because the plastic throw-away cup may be shaped so that its side wall includes sections of different contour and slope, the cup may be made to fit holders with a variety of different types and sizes of gripping means for retaining the cup in place.

These and other objects and features of this invention along with its incident advantages will be better understood and appreciated from the following detailed description of one embodiment thereof, selected for purposes of illustration and shown in the accompanying drawing in which:

FIG. 1 is a side view of a throw-away cup constructed in accordance with this invention;

FIG. 2 is a cross-sectional view taken along the section line 2—2 of FIG. 1;

FIG. 3 is a vertical section through a cup holder showing the cup of FIGS. 1 and 2 carried in it;

FIG. 3A is a bottom view of the cup and holder shown in FIG. 3;

FIG. 4 is a vertical cross-sectional view through another form of cup holder showing the cup of FIGS. 1 and 2 carried in it;

FIG. 5 is a fragmentary cross-sectional view showing the manner in which the cup nests in a stack of identical cups; and

FIG. 6 is an enlarged fragmentary detail of a portion of the cup stack of FIG. 5.

The container shown in FIGS. 1 and 2 is generally composed of a side wall **10** and a bottom wall **12** formed as a unitary structure and free of pleats, folds and seams, and other special contours which are inherent in truncated conical cups made of paper. The cup shown is made of thin and flexible plastic such as polystyrene .010 to .045 inch in thickness or other inexpensive material suitable for use in a disposable container. The side wall **10** is provided with a rolled rim **14**, and below the rim the wall is composed of two main sections **16** and **18** of different slope. The lower section **16** of the wall **10** flares upwardly at a greater angle than the upper section **18**, which general configuration has several advantages. First, the relatively wide flare at the lower section achieves a low center of gravity when the cup is filled and therefore constitutes a relatively stable article when disposed in the holder. Second, the reduced angle of flare in the upper section **18** reduces the diameter of the cup at the rim **14**, which makes it easier to drink from the cup. This is particularly noticeable when the cup is made in eight ounce sizes or greater because if the flare of the lower section **16** continues upwardly to the rim **14** the diameter of the rim is so large as to make it difficult to drink from the cup without the aid of a straw.

The lower end **20** of the side wall **10** immediately above the bottom wall **12** is composed of two generally cylindrical portions **22** and **24** which are provided to enable the cup to be used with a variety of holders having different sizes and shapes of gripping means. The lower cylindrical portion **22** is defined by a wall **28** which tapers upwardly and inwardly from its lower edge **30** at the junction with bottom wall **12** to its upper edge **32** where it turns outwardly into horizontally extending shoulder **34**. The taper of the side wall **28** enables the cup to nest in a stack with other identical cups as shown in FIGS. 5 and 6. In FIG. 6 it will be noted that the bottom wall **12** of the upper cup A sits on the shoulder **34** of the lower cup B, and the inner edge **32** of the shoulder which also constitutes the upper edge of the side wall **28** interferes with the lower edge **30** of the cup A so as to prevent the upper cup from jamming into the lower cup.

The upper cylindrical portion 24 of the lower end wall 20 of the cup is defined by a cylindrical wall 36 which extends upwardly from the outer edge 38 of the shoulder 34 and is of approximately the same height as the upward and inwardly tapered wall 28 of the lower portion 22. The wall 36 terminates in a horizontally disposed flange 40 which in turn joins the lower edge of section 16 of the side wall.

The lower upwardly and inwardly tapered wall 28 of the portion 22 is provided with four outwardly extending protuberances 42 which are equal in height to the height of the wall 28. The protuberances 42 are provided to cooperate with the gripping means of the cup holder as is evident in FIGS. 3 and 3A.

The lower end 20 of the side wall 10 is provided to cooperate with gripping means of different cup holder configurations to yieldably retain the cup in the holder. In FIGS. 3, 3A and 4 two different arrangements are shown. In FIGS. 3 and 3A a holder 50 is shown to have a side wall 51 with a generally smooth and downwardly tapered outer surface 52 which merges into a base or support 54 adapted to rest upon a table or other surface. The inner side of the wall 51 is provided with a cone-shaped surface 56 adjacent its top, which engages and supports the cup C disposed within the holder. An annular flange 58 extends inwardly from the bottom of the side wall 51, and its inner edge 60 is substantially coplanar with the surface 56. A plurality of spaced ribs 62 extend inwardly from the lower portion of the side wall, and the bottom of the ribs merge smoothly with the inner edge 60 of the flange. The inner edges 64 of the ribs are substantially vertical at the upper end, and taper downwardly and inwardly toward the inner edge 60 of the flange. The tops 65 of the ribs are flat and provide a seat for the base 54 of another holder when the holders are stacked on top of each other when not in use. The lower tapered portions of the ribs guide the bottom of the cup into the opening 66 of the flange when the cup is placed in the holder 50.

When the cup is placed in the holder, the upper portion of the lower side wall section 16 bears against the surface 56 and limits the depth to which the cup may be inserted into the holder. With the section against the holder surface 56, the lower cylindrical portion 22 of the lower end 20 of the cup lies within the annular flange 58, and the protuberances 42 are gripped by the edge 60 of the flange. They are slightly compressed by the inner edge of the flange, and the gripping action is sufficient to lift the outer cup from a stack of inverted cups nested together in the manner of FIG. 5.

In FIG. 4 a different type of holder 70 is shown, which possesses several spaced inwardly extending tabs 72 molded as an integral part of the holder side wall 74. The upper portion of the side wall 74 is provided with a supporting surface 76 comparable to the surface 56 in the holder 50 of FIG. 3. When the cup C is inserted in the holder the tabs 72 engage the cylindrical wall 36 of the upper portion 24. The tabs 72 which themselves may be somewhat flexible because of the thinness of the stock, bite slightly into the wall 36 to hold the cup in the holder. It will be appreciated that the tabs 72 could be replaced by a ring similar to the flange 58 of the embodiment of FIGS. 3 and 3A, and the ring could be formed either as an integral part of the holder or as a separate piece inserted into the holder in a channel provided for that purpose. The diameter of the side wall section 16 limits the depth at which the cup C may be inserted in the holder by engagement with the surface 76 of the wall 74. Thus, in FIGS. 3, 3A and 4 the cup C is shown to be suitable for use with a variety of holders having gripping means of different diameters.

From the foregoing description it will be appreciated that the use of plastic as a throw-away cup designed for use with a reusable holder provides the several advantages enumerated in the introduction. Because the material from which the cup is made is readily molded, irregular shapes may be provided so as to limit the diameter of the rim of the cups even in cups of relatively large volume, and different sections may be provided in the cup base which cooperate with cup holders of different varieties and enable the cups to be engaged firmly by the holders. Because the plastic shrinks when heated, the plastic cup after use as a hot drink container can readily be slipped from the holder, and somewhat greater latitude is afforded the manufacturer with respect to the dimension control of the container. That is, while the holder may grip the plastic cup more firmly than would be permissable with a paper cup when the cup is initially engaged by the holder, the cup will slip easily from the holder after it is used particularly for a hot drink.

From the foregoing description those skilled in the art will appreciate that numerous modifications may be made of this invention without departing from its spirit. Therefore, it is not intended that the breadth of this invention be limited to the specific embodiment described and illustrated. Rather, it is intended that the breadth of this invention be determined by the appended claims and their equivalents.

What is claimed is:

1. A thin wall, integral, thermoplastic insert drinking cup for use with a cup holder, comprising
- a side wall having upper and lower sections,
- the upper of said sections being upwardly flared at an angle substantially less than the upward flare of the lower section,
- a rolled rim provided at the top of the upper side wall section,
- a generally cylindrical wall connected to the bottom of the side wall,
- an inwardly extending flange provided at the bottom of the cylindrical wall,
- a second generally cylindrical wall connected to the inner edge of the inwardly extending flange and with the inner diameter of the upper end of one of said cylindrical walls being smaller than the outer diameter of the bottom of said one wall,
- and a bottom wall joined to the bottom of the second cylindrical wall.

2. A drinking cup as defined in claim 1 further characterized by
- a plurality of protrusions carried on the outer surface of the second cylindrical wall at spaced intervals about the cup.

3. In combination with the drinking cup of claim 2, a cup holder comprising,
- a generally circular wall surrounding the lower side wall section and supporting that section adjacent its top,
- and gripping means provided adjacent the bottom of the circular wall and engaging one of the cylindrical walls of the cup.

4. In combination,
- a cup made of plastic material with a side wall having upper and lower sections,
- the upper of said sections being upwardly flared at an angle less than the upward flare of the lower section,
- a rolled rim provided at the top of the upper side wall section,
- a substantially vertical cylindrical wall connected to the bottom of the side wall,
- an inwardly extending flange provided at the bottom of the cylindrical wall,
- a second generally cylindrical wall connected to the inner edge of the inwardly extending flange and with the inner diameter of the upper end of said second wall being smaller than the outer diameter of the bottom of said second wall,
- a plurality of protrusions carried on the outer surface of the second cylindrical wall at spaced intervals about the cup,

a bottom wall joined to the bottom of the second cylindrical wall,

a cup holder having a generally circular wall surrounding the lower side wall section and supporting that section adjacent its top,

an inwardly extending flange formed as an integral part of the circular wall and having an inner edge for gripping the protrusions on the cup to retain the cup in the holder,

and a plurality of ribs formed on the inner surface of the circular wall terminating at their lower end at the flange for guiding the bottom wall of the cup through the opening in the ring.

5. A thin wall, throw-away, insert cup for use with a cup holder, comprising,

a side wall and a bottom wall integrally formed of a thin and flexible thermoplastic material,

said side wall having an upper section and a lower section with said upper section being upwardly flared at an angle substantially less than the upward flare of the lower section,

a rim provided at the top of said upper side wall section to stiffen the side wall at the top and to provide for comfortable use in contact with the mouth of a user,

and means for engaging said cup with a reusable, reinforcing cup holder.

6. In combination with the drinking cup of claim **5**, a cup holder comprising a generally circular wall surrounding said lower side wall section and providing means for supporting said side wall,

and gripping means provided adjacent the bottom of the circular wall and engaging said engaging means.

7. In the combination of claim **6**, said cup holder further comprising, said gripping means comprising an inwardly extending flange for gripping said engaging means of said cup.

8. A thin wall, plastic, throw-away cup in accordance with claim **5** and further comprising said side wall and bottom wall substantially adjacent said lower wall section having a thickness in the range of from about 0.010 inch to about 0.045 inch.

9. A drinking cup comprising, a rigid reusable plastic holder having a generally downwardly tapered circular wall,

gripping means provided adjacent the bottom of the circular wall for engaging the lower portion of a cup inserted in the holder within the wall,

a relatively flexible thermoplastic cup generally frustro-conical in shape and releasably engaged by said gripping means and bearing against the uper portion of the circular wall,

said flexible thermoplastic cup flaring upwardly at an angle from its bottom to a point above an upper edge of said holder and flaring upwardly at a second angle from that point to its rim, said second angle being smaller than said first angle.

References Cited by the Examiner

UNITED STATES PATENTS

2,357,161	8/1944	Barbieri.	
2,738,914	3/1956	Hatch	220—97
3,091,360	5/1963	Edwards	220—97
3,207,461	9/1965	Holzwarth	220—97

FOREIGN PATENTS

525,563	5/1965	Canada.

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