June 17, 1969 N. K. MORRIS 3,450,391

AGITATOR

Filed Oct. 20, 1967 Sheet 1 of 3

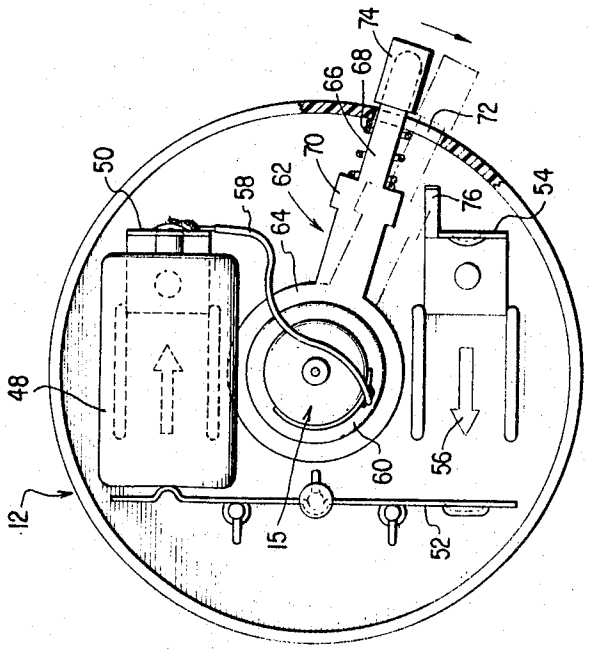
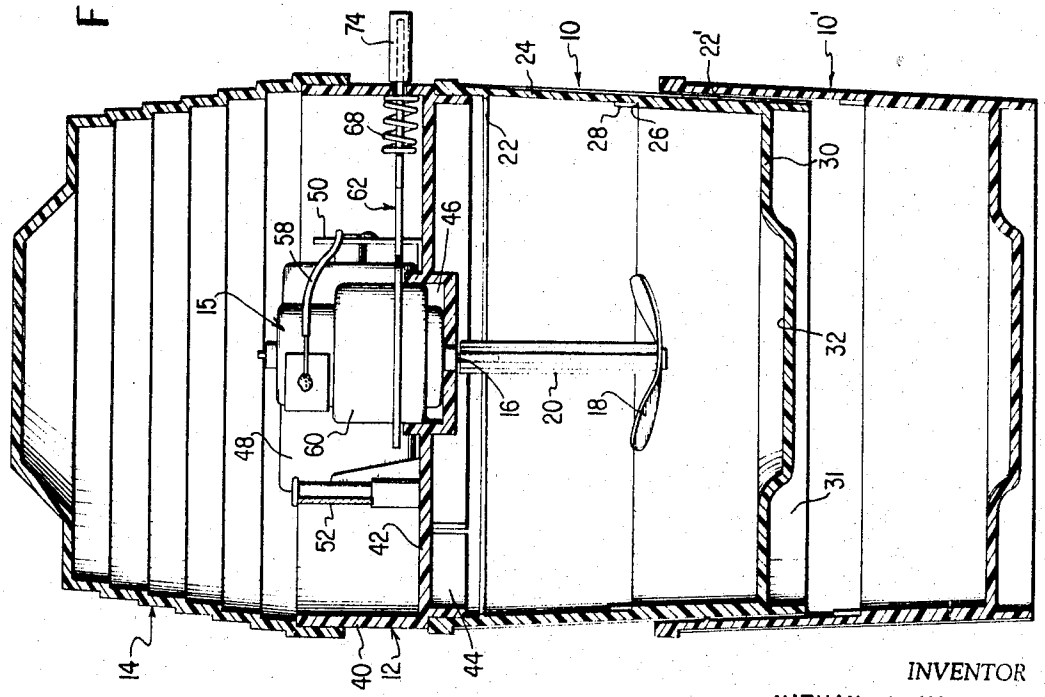


FIG. 2

FIG. 1



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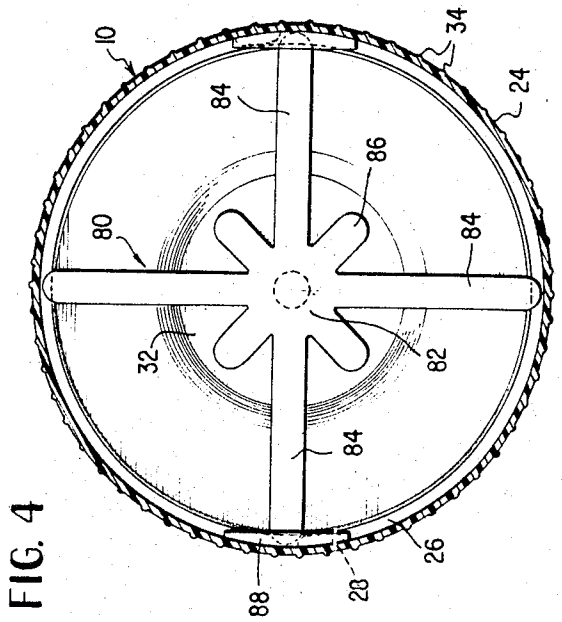


FIG. 4

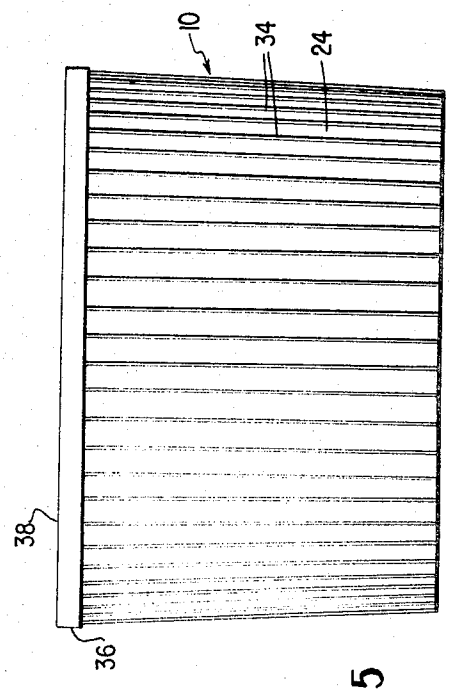


FIG. 5

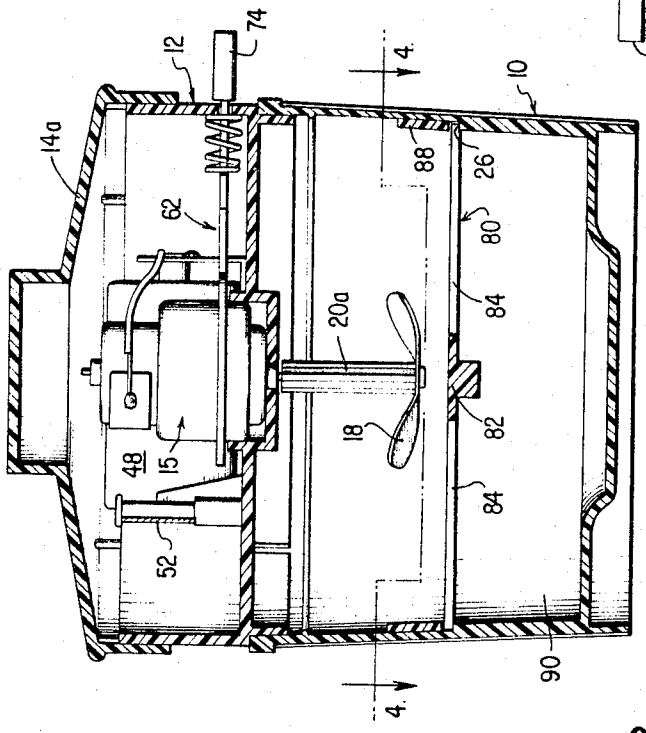


FIG. 3

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FIG. 6

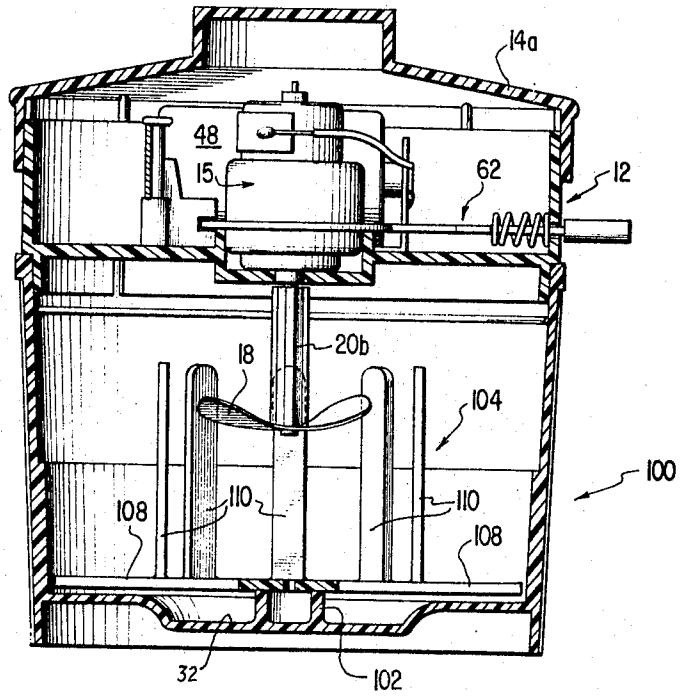
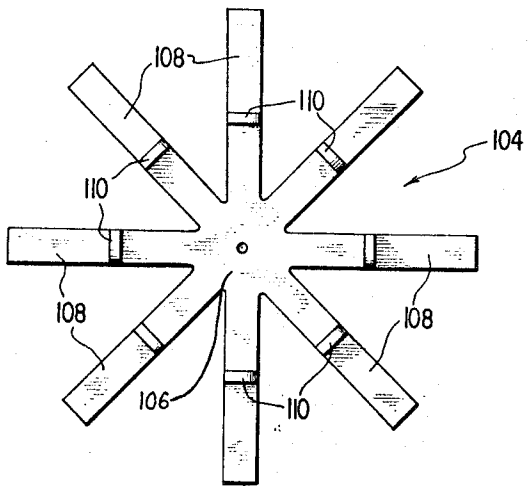


FIG. 7



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3,450,391

AGITATOR

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Int. Cl. B01f 7/20; B08b 3/00
U.S. Cl. 259—122 12 Claims

ABSTRACT OF THE DISCLOSURE

A portable agitator utilizing a self-contained battery power source to power a high-speed electric motor. The motor and batteries are housed in an upper section which rests on the container in which the mixing takes place. In one embodiment, the agitator is used as a drink mixer, and in a second embodiment it is used as a denture washer. In the second embodiment a hold-down member prevents damage to the dentures.

This invention relates to electrically powered agitators, and more particularly to agitators of the type utilizing a self-contained power source.

Electrically driven agitators are widely used for many purposes. Aside from the variety of industrial agitators, there are various types of agitators used in the home for such things as drink mixers, blenders, paint mixers, denture cleaners and the like. All of the various agitators in current use suffer from the joint disadvantages of being heavy and only operable from an external power source, usually 110 volts AC, so that they are not, in any way, portable.

A need has become apparent for an agitator which can be used to mix drinks both of the alcoholic and of the non-alcoholic variety which is portable in every respect. Such an apparatus would have to combine the features of having a self-contained power source as well as being light in weight and resistant to damage caused by impact from dropping luggage in which it is packed. Further, as wearers of dentures will readily recognize, there is a need for a completely portable denture cleaner so that people who are traveling can easily clean their dentures without being put to considerable inconvenience.

It is, accordingly, an object of the present invention to provide an agitator which is portable and operates from a self-contained power source.

It is a further object of this invention to provide a lightweight agitator which operates from a self-contained power source and may be used as a drink mixer.

Another object of this invention is to provide a portable agitator with a self-contained power source which is adaptable for use in washing dentures without damaging the same.

This invention will be better understood, and objects other than those set forth will become apparent after reading the following detailed description thereof. Such description refers to the annexed drawings presenting preferred and illustrative embodiments of the invention.

In the drawings:

FIGURE 1 is a vertical sectional view of a drink mixer constructed in accordance with this invention;

FIGURE 2 is a top plan view of the upper section of an agitator according to the invention showing the motor, self-contained power source and switch mechanism, with a portion shown in section;

FIGURE 3 is a vertical sectional view of a denture cleaner constructed in accordance with this invention;

FIGURE 4 is a horizontal cross-sectional view of a denture washer according to this invention taken on the line 4—4 of FIGURE 3, showing the hold-down member;

FIGURE 5 is a vertical elevational view of the container used in the agitator according to this invention;

FIGURE 6 is a vertical sectional view of a denture cleaner constructed in accordance with another embodiment of this invention; and

FIGURE 7 is a top plan view of the denture holder of FIGURE 6.

Referring now to the drawings, in FIGURE 1 is shown a drink mixer in accordance with this invention which comprises a cup-shaped container **10**, an upper section **12**, a cover **14** and a motor **15** located in the upper section **12** with a shaft **16** protruding downwardly therethrough and a propeller **18** driven by the motor **15** and connected thereto by drive shaft **20**.

The container **10** sits in an identical container **10'** which is provided merely for decorative purposes and as an additional drinking cup. Container **10** tapers inwardly at the lower end thereof so that it is slightly smaller at the bottom than at the top. A ridge **22** is disposed radially on its inner surface in spaced relationship with the top so that a container **10** may be nested within another such that its outer wall **24**, which is slightly downwardly tapered, will be frictionally engaged with the ridge **22** of the container into which it is being inserted. This can be seen in FIGURE 1 where container **10** is inserted into the additional container **10'** where it is frictionally engaged by the ridge **22'**. Container **10** also contains a shoulder **26** disposed radially on its inner surface in a spaced relationship with the top and the bottom of the container **10**. Associated with the shoulder **26** are two stops **28** disposed opposite each other. The shoulder **26** and the stops **28** will be further described in reference to a second embodiment hereinbelow.

Container **10** also includes a bottom portion **30** which contains a centrally disposed well portion **32** having a flat bottom surface. Wall **24** extends downwardly beyond bottom portion **30** to form a flange **31**. The outer surface of the wall **24** of container **10** comprises vertical ribs **34** (FIGURE 5) which serve a dual function of engaging ridge **22** when several containers are nested together and also of preventing the container **10** from slipping from a user's hand if the outer surface should be wet, and circumferential bead **36** the top of which forms the rim **38**. The container **10** is made of any suitable plastic and may be transparent or opaque. It may also be clear or colored for added attractiveness. Typical plastics which may be used for container **10**, as well as for other plastic components as hereinafter described, and which are by no means limiting, are "Delrin," polycarbonates, polyolefins, polydiolefins, and vinyl polymers.

The upper section **12** has a substantially circular side wall **40**, a bottom portion **42** and an outer peripheral downwardly extending flange **44** inwardly of the outer circumference of the upper section **12**. The upper section **12** rests on the upper surface **38** of the container **10** with the flange **44** abutting the inner circumferential edge of the container **10**. Centrally located in the bottom **42** of the upper section **12** is a well **46**. The motor **15** is mounted in the well **46**, frictionally engaging the walls thereof. The shaft **16** protrudes through the bottom of the well **46** in order to drive the propeller **18** by means of the drive shaft **20**.

Referring now to FIGURE 2, motor **15** is a high-speed electric motor which operates on a self-contained DC power source provided by two C type flashlight batteries or the like **48**. The flashlight batteries **48** are located on either side of the motor **15** in the upper section **12** making contact with battery clips **50**, **52** and **54** and are placed so that they will be connected in series. Arrows **56** are provided in upper section **12**, either by molding or by other well known means, for the convenience of the user to indicate the proper placement of the batteries **48**. The battery clips **50**, **52** and **54** are constructed of a suitable

metal and are fixedly secured to the upper section **12** by known means.

The internal circuitry of the motor **15** is such that one pole of the same is connected to battery clip **50** by means of wire **58** and the second pole of the motor is grounded to the metal motor housing **60**. The switch mechanism, generally designated by numeral **62**, comprises contact-pivot ring **64** with shaft **66** extending radially outwardly therefrom. A spring **68** is placed on shaft **66** abutting the wall of upper section **12** at one end thereof and shoulders **70** of shaft **66** at the other end thereof. Contact-pivot ring **64** encircles housing **60** and is in intimate contact therewith so as to provide an electrical connection. Shaft **66** extends through slot **72** in the wall of the upper section **12**. Handle **74** is slidably engaged on the end of shaft **66**. The spring **68** serves to assist in locking the motor **15** in place. Battery clip **54** includes contact portion **76** situated such that when switch **62** is slidably moved to the "on" position, shown in phantom lines in FIGURE 3, either the shaft **66**, the spring **68**, or both will contact the same and complete the electrical circuit to the motor **15**.

Cover **14** is seated upon upper section **12** to enclose the motor **15**, batteries **48** and switch **62** and prevent dust or moisture from entering. The cover **14** can be any suitable size and shape, such consideration being dictated only by aesthetic principles. It should be noted that while container **10**, upper section **12**, cover **14**, drive shaft **20** and switch handle **74** are fabricated of plastic they need not all be of the same plastic composition but could be fabricated of dissimilar materials.

The inventive mixer of FIGURE 1 is used by placing the ingredients to be mixed into the container **10**, placing the upper section **12** and cover **14** upon the container **10**, activating the motor and propeller by means of switch **62**, and allowing the apparatus to run for a sufficient length of time to thoroughly mix the ingredients. As already noted, container **10** is constructed such that it can be used as a convenient cup and container **10***a* can be utilized as an additional drinking cup.

Turning now to another embodiment of this invention, there is shown in FIGURES 3 and 4 a denture washer embodying the basic construction described hereinabove. Upper section **12** is seated upon cup-shaped container **10** and has the motor **15**, batteries **48**, and switch mechanism **62** mounted therein. Cover **14***a* encloses the upper section **12**. Plastic hold-down member **80** is seated upon shoulder **26**. Hold-down member **80** comprises a central portion **82** and a plurality of extensions **84** and **86** radiating outwardly from the central portion **82**. While four extensions **84** are shown of sufficient length to rest on the shoulder **26**, it should be understood that three or more extensions of such length will suffice to provide the necessary support and balance for the hold-down member **80**, with four being the preferred number. Extensions **86** radiate outwardly a shorter distance than extensions **84** and, by this configuration, assist in providing the proper water circulation. When the hold-down member **80** is placed in the container **10** to rest on the shoulder **26**, it is turned such that two of the extensions **84** will contact the stops **28** which prevent further rotation of the hold-down member **80**. Locking members **88**, also fabricated of a suitable plastic, are provided to prevent the hold-down member **80** from upward movement. The relation between stops **28** and extensions **84** is such that when the motor **15** is in operation turning the propeller **18**, the direction of movement of the liquid will force the extensions **84** against the stops **28** rather than away from the same. The drive shaft **20***a* is such length that the propeller is located immediately above the hold-down member **80**. The dentures are placed in the compartment **90** of container **10** which is created by the placement of hold-down member **80**.

To operate the inventive denture cleaner the user will place his dentures in the lower compartment **90**, place the hold-down member **80** into position on shoulder **26**, pour water into container **10** to the proper level and add a conventional denture cleansing agent. The upper section **12**, with batteries **48** and cover **14***a* in place, will then be placed upon container **10** and switch handle **74** moved to the "on" position to start the motor **15**, thereby turning the propeller **18**. The switch **62** is then moved to the "off" position and the dentures are allowed to soak for a desired length of time or are removed.

FIGURES 5 and 6 depict another embodiment of the inventive denture cleaner. The upper section **12** containing the motor **15**, batteries **48** and switch mechanism **62**, and the cover **14***a* are essentially identical with the like-numbered parts of FIGURE 3. The upper section **12** is seated upon cup-shaped container **100**.

Cup-shaped container **100** is modified by the addition of upstanding annular boss **102** located centrally on the bottom surface of centrally disposed well portion **32**. Denture holder **104** rests upon the boss **102** in a freely rotatable manner.

Denture holder **104** comprises a central portion **106** and a plurality of extensions **108** radiating outwardly from central portion **106**. The center portion and extensions may be fabricated of one piece of plastic as shown in FIGURES 6 and 7, or it may be made of a plurality of pieces secured together by conventional means. Upstanding fingers **110** are located on the radial extensions **108** approximately intermediate the center and the extremities of radial extensions **108** and are concentrically disposed about the center. The fingers **110** extend upwardly for a sufficient distance that they will be higher than a set of dentures which would be placed upon the radial extensions **108**.

The drive shaft **20***b* is of sufficient length that propeller **18** will be located on a level approximately midway between the top and the bottom of fingers **110**.

In use, the dentures are placed in the inventive denture cleaner of this embodiment, to rest on the radial extensions **108**. Water is poured into the container **100** to the proper level and a conventional cleansing agent is added. The upper section **12** is placed upon the container **100** and the switch **62** moved to the "on" position to start the motor **15**, thereby turning the propeller **18**. Due to the motion of the water caused by the propeller, the freely rotating denture holder **104** turns in a "carousel-like" fashion and provides the dentures with an extra modicum of agitation. When the cleaning is sufficiently performed, the switch is moved to the "off" position and the dentures are allowed to soak or are removed.

After reading the foregoing detailed description, it will be apparent that the objects set forth have been successfully achieved.

What is claimed is:

1. An agitating apparatus which is adapted to clean dentures, comprising a cup-shaped container having a substantially circular side wall, a removable upper section seated upon said container, an electric motor disposed within said upper section with a propeller shaft protruding downwardly therethrough, a propeller fixedly secured to a lower portion of said shaft, a bottom portion in said cup-shaped container, a centrally disposed well portion having a flat bottom surface in said bottom portion, an upstanding annular boss located centrally on said flat bottom surface, and a denture holder resting on said boss, said denture holder comprising a central portion, a plurality of extensions radiating outwardly from said central portion, and a plurality of upstanding fingers located approximately intermediate the center and the extremities of said extensions and concentrically disposed about the center.

2. An agitating apparatus as defined in claim **1**, wherein a self-contained direct-current power source for said motor is disposed within said upper section.

3. An agitating apparatus as defined in claim **2**, wherein said motor is a high-speed electric motor having a metal housing, said metal housing comprising one electrical

terminal of said motor, said motor further including a second terminal connected to one terminal of said power source, said apparatus further comprising switch means for connecting said one electrical terminal to a second terminal of said power source.

4. An agitating apparatus as defined in claim **3**, wherein said switch means comprises an elongate metal shaft rotatably mounted on said metal housing in electrical contact therewith such that said switch means contacts said second terminal of said power source when in one position, thereby completing an electrical circuit to operate said motor, and such that said switch means breaks said electrical circuit when in a second position.

5. An agitating apparatus as defined in claim **1**, further comprising a cover member removably attached to said upper section to protect said motor from damage.

6. An agitating apparatus as defined in claim **5**, wherein said container, said upper section and said cover are fabricated of at least one type of plastic.

7. An agitating apparatus as defined in claim **6**, wherein said plastic comprises at least one member of the group consisting of polyolefins, polycarbonates, polydiolefins, and vinyl polymers.

8. An agitating apparatus as defined in claim **6**, wherein said plastic comprises Delrin.

9. An agitating apparatus which is adapted to clean dentures, comprising a cup-shaped container having a substantially circular side wall, a removable upper section seated upon said container, an electric motor disposed within said upper section with a propeller shaft protruding downwardly therethrough, a propeller fixedly secured to a lower portion of said shaft, a shoulder disposed radially on the inner surface of said container at a distance from the bottom of said container sufficient to allow said dentures to rest between said bottom and said shoulder, hold-down means to prevent said dentures from being dislodged by said propeller, said hold-down means comprising a central portion and a plurality of extensions radiating outwardly from said central portion for a sufficient distance that said extensions rest on said shoulder, and securing mean sassociates with said shoulder to secure said protector means from being dislodged by said propeller and allow easy removal of said protector means for maintenance.

10. An agitating apparatus as defined in claim **9**, wherein said hold-down means includes at least three of said outwardly radiating extensions of a sufficient length to rest on said shoulder.

11. An agitating apparatus as defined in claim **10**, wherein said hold-down means includes four of said extensions of a sufficient length that they rest on said shoulder, and four additional extensions of a shorter length than the aforesaid four extensions.

12. An agitating apparatus which is adapted to mix drinks, comprising a cup-shaped container having a substantially circular side wall, a removable upper section seated upon said container, an electric motor disposed within said upper section with a propeller shaft protruding downwardly therethrough, a propeller fixedly secured to a lower portion of said shaft, said cup-shaped container comprising a first container which is slightly downwardly tapered so that the lower portion of said container is smaller than the upper portion of said container, and a base consisting of a second cup-shaped container with a radially disposed ridge on the inner surface of its upper portion frictioanlly engaging the lower portion of said first container, said second cup-shaped container being removable to be utilized as a drinking cup.

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ROBERT W. JENKINS, *Primary Examiner.*

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