

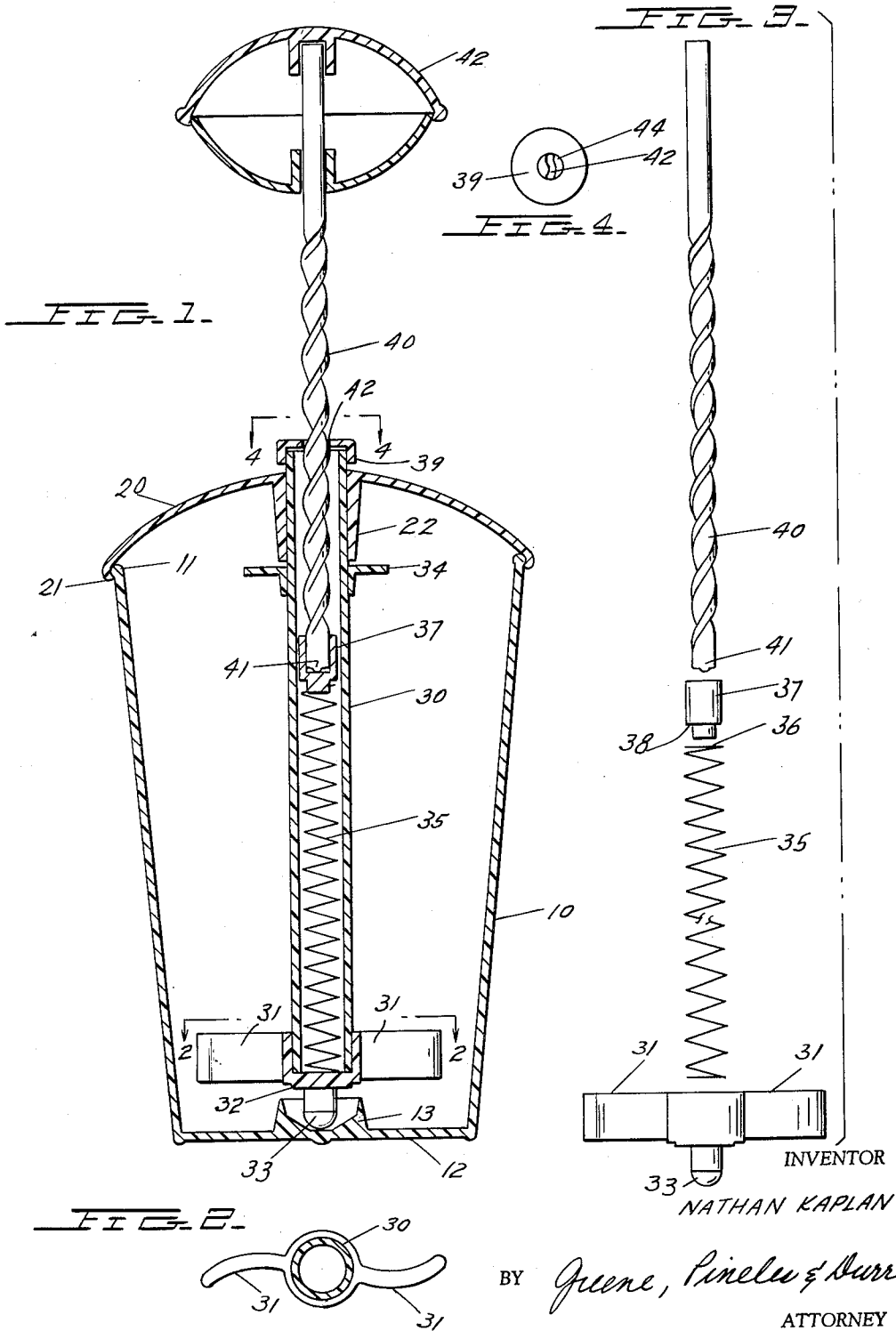
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N. KAPLAN
MIXING DEVICE

3,009,686

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2 Sheets-Sheet 1



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FIG. 6.

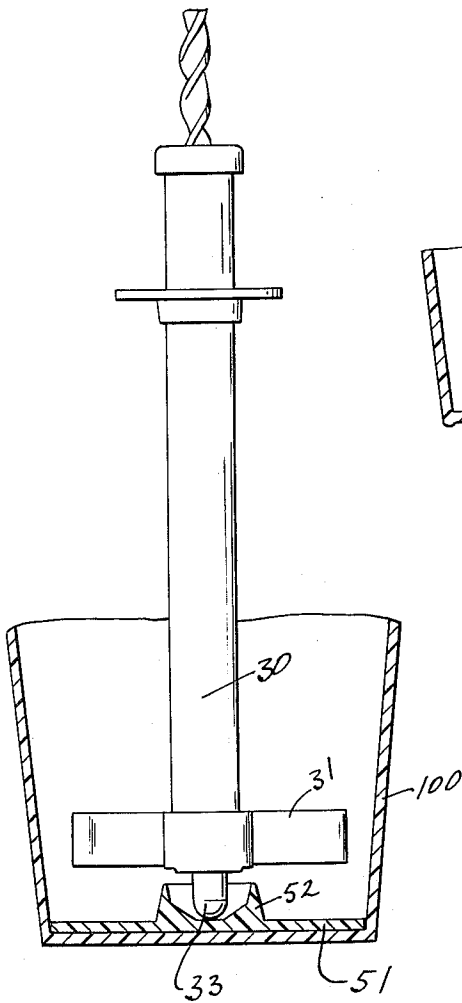
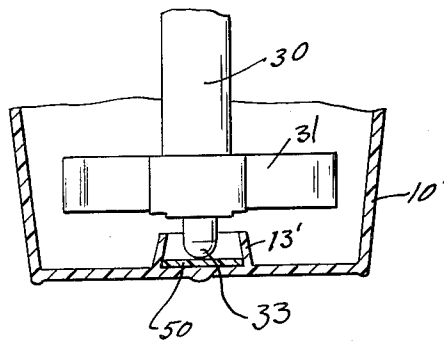


FIG. 5.



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MIXING DEVICE

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4 Claims. (Cl. 259-101)

This invention relates to a mixing device especially useful for mixing drinks.

Among the objects of the invention is to provide a mixing device, especially useful for mixing drinks, which is made of plastic material and in which no metal parts come into contact with the liquid being mixed.

Among other objects of the invention is to provide a mixing device with a snap-on flexible sealing lid to prevent leakage of liquids being mixed therein.

Among other objects of the invention is to provide a mixing device with a container that incorporates means to properly position or centrally locate the propeller means therein.

The objects of the invention are obtained by providing a combination container, snap-on cap and stirring means. The container contains a beaded rim at the top to receive the snap-on cap and a well at the central portion of the bottom to centrally position the lower end of the stirring means. The snap-on cap is made of flexible material so that it can be flexed and/or stretched to fit tightly about or within the rim of the container. The central area of the cap contains a tubular opening adapted to receive the shaft of the stirring means and to guide the shaft of the stirring means to its proper position within the container. The stirring means comprises a plastic tube adapted to extend throughout the length of the container. The plastic tube contains stirring means extending radially from the surface thereof, a centering pin at its lower end to fit into the well of the container and an internal compression spring within the tubular opening thereof. The upper portion of the plastic tube stirrer comprises means having a non-circular opening therein for causing the tube to rotate when a spiral rod is pushed through. A spiral rod and handle are provided to cooperate with the spring and non-circular opening to rotate the plastic tube when alternately pushed and released by one using the mixer.

The spring and spiral rod which are conveniently made of metal do not come into contact with any of the liquids held in the container. All the remaining parts of the device are made of those types of plastic materials which are odorless, tasteless, and non-reactive with liquids in general. Polyethylene, linear polyethylene, polypropylene, acetal resins (such as "Delrin") etc. are very satisfactory materials from which to form the plastic parts of the device of this invention.

In the drawings:

FIG. 1 is a side cross sectional view of one embodiment of the invention.

FIG. 2 is a detail view taken on line 2-2 of FIG. 1.

FIG. 3 is an exploded view of the rotating mechanism of the device.

FIG. 4 is a detail view of the cap of the stirring tube.

FIG. 5 is a side cross sectional view of a modified form of the invention.

FIG. 6 is a side cross sectional view of still another modified form of the invention.

The device as shown in FIG. 1 comprises the container 10 having a beaded upper rim 11. The container shown is of inverted frusto conical shape but it may be circular or polygonal in cross sectional shape or it may be cylindrical as well as frusto conical in shape. It is essential, however, that the bottom 12 of container 10 includes a well 13 formed therein at the central area thereof.

The top or cap portion 20 is made of flexible plastic material and, as shown, comprises an overhanging lip

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portion 21 adapted to provide a snap fit with the beaded rim 11 of container 10. A cap which snapped within the rim 11 may be employed as well as the one shown which snaps about the rim 11. The cap 20 comprises a central tubular portion 22 adapted to snugly fit around the stirring tube 30.

The stirring tube 30 has one or more pairs of stirring projections 31 affixed to the lower end thereof. The projections 31 are formed of a single piece of plastic material which at the central portion 32 also closes the end of tube 30. Since the cap 20 must be of flexible material it is not capable of withstanding any thrust applied axially with respect to the tubular portion 22. It is essential, therefore, that the stirring tube 30 contain means such as the extension 33 to fit within well 13 of container 10 and centrally position as well as limit the axial movement of the tube 30 with respect to the container. The cap 20 is fixed upon the stirring tube 30 by the flanged disk 34 which also prevents any splattering of liquid through the opening between tube 22 and tube 30. Since the tube 30 rotates in the tube 22 which acts as a bearing these parts are not tightly fitted together.

A spiral spring 35 fits within the tube 30 and extends upwardly from the bottom more than half of the length of tube 30. The top coil 36 of spring 35 is adapted to rest on the shoulder 38 of the cup 37. The cup 37 is adapted to receive the end 41 of the spiral rod 40. The upper end of tube 30 is fitted with a cap 39 to which is fixed a disk 44 having a non-circular opening 42 adapted to admit the spiral rod 40. Although the rod 40 will be admitted by opening 42 when properly oriented, the rod will not rotate within the opening 42 but instead will cause the cap 39 and thus the tube 30 to rotate when the rod 40 is moved axially with respect to the cap 39. The upper end of rod 40 is fitted with a suitable handle 42.

When the device is operated it will be seen that, even though the cap 20 is flexible enough to be snapped onto container 10, this cap will not be under strain or collapsed by pressure applied to the handle 42 because the position of the stirrer tube 30 within the container 10 is fixed by the well 13 and projection 33. If the container is accidentally overturned when the handle 42 and rod 40 are removed no spillage takes place because the flanged disk 34 moves against tubular portion 22 of the cap to seal the opening. When the cap 20 is removed the stirrer device 30 is retained with the cap by the disk 34 and cap 39. The spring 35 and cup 37 are always sealed-off from the contents of the container 10. It will also be noted that the parts of the container cap and stirring shaft contain no undercuts or deeply recessed areas where food particles or dirt can accumulate to make the parts difficult to keep clean.

As noted above, polyethylene and polypropylene are very satisfactory materials for making the container and other parts of the device. The spiral rod 40 is conveniently made of metal since it is protected from contact with the liquids in the container, although it may also be made of plastic, if desired. It is found that the well 13 bulges downwardly in the operation of the device and although polyethylene and polypropylene do not have a high coefficient of friction the bulging tends to increase the friction between the container and the extension 33. In the modified form of the device shown in FIG. 5 the operation is improved by snapping a hard plastic disk 50 into the well 13'. This hard plastic disk may be made of "Delrin" (an acetal resin) or polystyrene, for example.

The form of the device shown in FIG. 6 is constructed so that it can be employed with any container 100. The combination of this modification comprises a disk 51 provided with a well 53 to position the stirring tube 30 by means of the extension 33. The remainder of the device is as in FIG. 1 but no cap 20 is necessary. Even

though the disk 51 does not fit as snugly into the bottom of a container 100 as is shown, well 52 of the disk still serves to space the stirring arms 31 from the sides of the container 100.

The features and principles underlying the invention described above in connection with specific exemplifications will suggest to those skilled in the art many other modifications thereof. It is accordingly desired that the appended claims shall not be limited to any specific feature or details thereof.

I claim:

1. In a mixer device the combination comprising a container, a cap for the container and a rotating stirring means, said container having an opening at the top thereof and a bottom containing a central depression therein, said cap being formed of flexible plastic material and having a concave configuration with a rim of approximately the same size as the opening in said container, interfitting means on the edge of said container opening and on the rim of said cap providing for a tight snap-on fit between the rim of the opening and said cap, said cap including a tubular opening in the central portion thereof, said rotating stirring means comprising a tubular section of plastic material extending upwardly from approximately the bottom of the container through the tubular opening in said cap when the latter is in place on said container, means for closing the lower end of said tubular section and at least two radial stirring projections extending from the lower portion thereof, means at the lower end of said tubular section fitting within the centrally located depression of said container and thereby positioning said tubular section with respect to the bottom of a container, manually operated spiral rod means adapted to extend varying distances into the tubular stirrer section of the stirring means, follower means on said tube engaging said spiral rod for rotating said tube upon axial movement of said rod in said tube, said tubular stirrer section shielding said spiral rod from contact with the contents of said container.

2. A mixer device comprising in combination a container having an open top and including a bottom wall having bearing means, a cap, a tube journaled at its upper end in said cap and having support means at its lower end for engaging said bearing means, a stirrer on said tube, a spiral rod extending into said tube, follower means on said tube engaging said rod for rotating said tube upon axial movement of said rod in said tube, spring means in said tube engaging said tube and said rod and urging said rod to a raised position relative to said tube, handle means on said rod for actuating said tube, and means detachably securing said cap to said container so that the assembly of said cap, said tube, said stirrer, said rod and said spring may be simultaneously removed from said container.

3. A mixer device comprising in combination a container having an open top and including a bottom having bearing means, a cap, a tube journaled at its upper end in said cap and having support means at its lower end for engaging said bearing means, a stirrer on said tube, a spiral rod extending into said tube, follower means on said tube engaging said rod for rotating said tube upon axial movement of said rod in said tube, spring means in said tube engaging said tube and said rod and urging said rod to a raised position relative to said tube, handle means on said rod for actuating said tube, and means detachably securing said cap to said container so that the assembly of said cap, said tube, said stirrer, said rod and said spring may be simultaneously removed from said container with said tube protecting said rod from contact with the contents of said container, said follower means comprising another cap on said tube, said another cap having a slot therein through which said rod extends.

4. A mixer device comprising in combination a container having an open top and including a bottom having bearing means, a flexible cap snap fitted on said container in a detachable manner over said open top, a tube journaled at its upper end in said cap and having support means at its lower end for engaging said bearing means, a stirrer on said tube, a spiral rod extending into said tube, follower means on said tube engaging said rod for rotating said tube upon axial movement of said rod in said tube, spring means in said tube engaging said tube and said rod and urging said rod to a raised position relative to said tube, handle means on said rod for actuating said tube, and means secured to said tube for securing said tube to said cap so that the assembly of said cap, said tube, said stirrer, said rod and said spring may be simultaneously removed from said container with said tube protecting said rod from contact with the contents of the container.

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