ATTACHABLE MIXING DEVICE

Inventor: Paul DiGaetano, JR., Nutley, NJ (US)

Correspondence Address:
RALPH T. LLORE
60 ROUTE 46 EAST
FAIRFIELD, NJ 07004 (US)

Appl. No.: 12/313,381
Filed: Nov. 21, 2008

Publication Classification

Abstract

A portable, re-usable mixing device adapted to be removably attachable and re-attachable to a material entry site of a container of a liquid to be blended with another material. The mixing device has a housing encompassing a mixing chamber having, relative to the vertical plane, an upper end and a lower end. The upper end has a re-openable and re-closeable cover such as a screw cap, or any other closure device for the mixing chamber, although under some circumstances, the upper end itself maybe closed and not be re-openable and re-closeable. The lower end is adaptable for removable attachment to the container containing the liquid or other material to be blended whereby said mixing chamber is in substantially liquid sealable communication with the inner volume of said container.
ATTACHABLE MIXING DEVICE

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] NONE

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] This invention relates to an article of manufacture which can be used to facilitate the mixing of solid or liquid materials such as powders, vitamins, medicines, and the like, into liquids or other materials such as water, juices, sport drinks, or particulate materials and the like. More particularly, it relates to a device which is attachable to and detachable from a container which holds or is capable of holding liquids or other materials into which various other materials are desired to be admixed.

[0003] It is common in current popular culture to blend or mix various materials into liquids for consumption. For example, one often encounters consumers carrying portable, personal-size water or liquid bottles into which various materials may be blended. For another example, athletes, exercisers, runners or even sedentary consumers, may desire to blend into a liquid drink materials such as bulking materials, a vitamin mix, a fibrous material, or the like, which often are very resistant to easy dispersion throughout the liquid. The various containers used might be personal-sized containers or even larger containers such as large bottles of fruit juice, sport drinks, alcoholic drinks, water and the like. The closures on such containers are predominantly standard screw cap closures and often corks, stoppers, snap-fits or the like, all of which are well-known in the art.

[0004] Materials to be blended include powdered, particulate and liquid materials such as medicines, vitamins, and various other materials, some of which are difficultly discurable in the liquid to be consumed or otherwise used. If one were simply to pour the material to be blended into the drinkable liquid or other material, re-apply the screw cap (or other closure device) and attempt to vigorously shake the contents, the task of dispersion would be especially hampered since there is usually only a small space available in the void between the top of the liquid in the container and the underside of the screw cap or other closure means (hereafter the “void space”). One can imagine that the liquid contained in a bottle having a small void space does not provide enough room to allow for vigorous shaking and mixing of the liquid within the container even in the absence of the material with which it is to be blended, let alone in the presence of a significant volume of material to be blended.

[0005] As an example of this in the prior art, if one wished to stir a quantity of a poorly soluble, dispensable bulking agent into a personal size bottle of water, the action would be unwieldy and awkward unless some of the water is removed and the blending effected either in that container or in a larger container by stirring or some such method. The same situation would exist for many other liquids in various size containers.

[0006] It therefore is easy to envisage the difficulty one would encounter if one attempted to suspend particulate material in the drink with only a small volume of shakable space into and out of which liquid maybe vigorously moved.

BRIEF SUMMARY OF THE INVENTION

[0007] The above disadvantages and others, maybe overcome by the present invention which provides, among other things a portable, re-useable mixing device adapted to be removably attachable and re-attachable to a material entry site of a container of the liquid to be blended and wherein the device itself provides additional space in which the liquid and the material to be blended can be moved back and forth with vigorous shaking to effect the mixing and dispersion. The mixing device comprises a housing which generally defines the space (a mixing chamber) into which, when attached to the container at an entry site, the material to be blended from the container can move from the container containing the material and mix with the particulate matter or liquid into the larger volume space provided by the mixing device itself. With shaking, the materials can move back and forth through the container and the extra space thus provided by the mixing device.

[0008] The mixing device thus comprises a housing encompassing a mixing chamber having, relative to the vertical plane, an upper end and a lower end. The upper end comprises a re-openable and re-closeable cover such as a screw cap, or any other closure device for the mixing chamber, although under some circumstances, the upper end itself maybe closed and not be re-openable and re-closeable, as will be seen later. The lower end is adaptable for removable attachment to the container containing the liquid or other material to be blended whereby said mixing chamber is in preferably substantially liquid sealable communication with the inner volume of said container. Various modifications of the mixing device can be introduced as will be seen below whereby a variety of alternatives can be presented to the consumer offering great flexibility in the manner and function of the mixing device. This will be seen from the detailed discussion and drawings which appear below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The mixing device can be seen as having several aspects of function from the following Figures wherein

[0010] FIG. 1 shows one embodiment of the device,

[0011] FIG. 2 shows a cross-section of another embodiment of the device,

[0012] FIG. 3 shows a cross-section of a third embodiment and

[0013] FIGS. 4, 5 and 6 show variations in a portion of the closure means.

DETAILED DESCRIPTION OF THE INVENTION

[0014] Referring now to the Figures wherein like parts are identified by like numbers, FIG. 1 shows one embodiment of the invention. In this depiction, the device 10a is generally cylindrical in shape, which is its preferred configuration. Mixing chamber 11a may be empty initially or it may be filled with the material to be added to the liquid to be later admixed therewith. In the Figures it is empty.

[0015] The upper end 12a of the device 10a is provided with closure means 13a which acts to seal off the contents of the mixing chamber 11a against leakage as will be seen later. Standard screw cap threading may be employed in 13a, in which case the upper end may be a threaded male part 13a. A
female threaded closure cap 14a (shown in partial cutaway view in FIG. 4) is used to threadably engage and disengage 13a, the combination of 13a and 14a being the closure means at the upper end of FIG. 1. The closure means may itself be permanently closed as shown in 12b and 12c so that the device is a single unitary shape (see FIG. 2 at 12b and FIG. 3, 12c). In FIGS. 1 and 2, lower end closure means 16a and 16b are shown as a female threaded attachment in FIG. 1 (dotted lines) and FIG. 2 respectively, threadable onto a male threaded opening 17 of liquid container 20. If opening 17 is a straight opening, such as in standard liquid bottles without a screw top opening, for example, a pressure snapable lid, 16c in FIG. 3, can be used. These can be removably engaged, dis-engaged and re-engaged with an appropriately reciprocally configured liquid container closure means 17 (with or without threads) as desired. FIG. 6 shows the remaining portion of closure means plug 19 which is engageable with its partner 16a (FIG. 1) to act as the means by which device 10a can be entirely closed, when closure cap 14a is engaged with 12a. Thus, the device represented by device 10a with cap 14a and plug 19 fully engaged represents the preferred device of this invention ready for use. The upper end 12a, FIG. 1, as noted is closeable with a screw cap 14a. If 12a is not a male thread but a female threaded opening, it may be closed by a reciprocally threaded male plug such as that shown in FIG. 6. If 12a does not have an internal thread, a pressure stopper of appropriate material such as rubber, cork, synthetic material or the like (not shown) may be used to complete the closure means. As noted previously, the upper end 12b and 12c may be permanently closed off being coniguous in form and shape with the body of device 10b and 10c as a permanent unitary part of the device as shown in FIGS. 2 and 3.

[0016] The lower ends 16a, b and c of chambers 11a, b and c are meant to be applied to the entry site 17 of the container 20, FIG. 1, in which the materials to be mixed is present. In such a case, the lower ends 16a, b and c maybe of any configuration which will satisfy the function of the device, provided it is attachable to the container 20 at its entry site 17 to provide reasonably tight sealing so that in use liquid contents of the container will not be spilled.

[0017] In the Figures, while lower end 16a and b are shown as a threaded female end (dotted lines FIG. 1) attachable to the threaded receptacle 17 of any available liquid container 20, as opposed to water, soda, fruit juices, milk or the like, they could, however, be threaded on their outsides if the container entry site has female threads. The method of closure shown in FIG. 3, 16c, is a snap fit closure means (see 18) which could be used when entry site 17 is provided originally with a stopper type of closure. The closure device of FIG. 3 could fit inside the neck 17 or it may fit over the neck depending on the desires of the user and the geometry of the container and mixing device.

[0018] A common manner of using the device of the invention is as follows:

[0019] Device 10a is depicted in FIG. 1 with its mixing chamber 11a empty and its closure means 13a detached from its cap 14a. There is provided, for example, a standard 16 ounce plastic bottle 20 of liquid, originally closed at its top end via standard screw cap means (not shown) on the threaded bottle neck 17.

[0020] A desired amount of material to be blended with the liquid is selected. A typical choice would be a bulking powder or powdered vitamin mix or some other material such as fruit mix, a soup mix, sugar or any such material. The amount used will be known to or otherwise selected by the user or may even be packaged by the supplier of the mixing device. The material is placed in the mixing chamber 11a of device 10a either via the open lower end 16a or the upper open end 12a, if indeed an openable end were chosen. The volume of the device chamber and the configuration of the device is selected so that it will accommodate enough of the material to be mixed and permit sufficient mixed and blended liquid material to move through the container 20 into the mixing chamber 11a and thus provide space for liquid and particulate material to be constantly mixed back and forth and thus be admixed.

[0021] Once the closure means (the screw cap, not shown, in this case) of the fruit juice bottle is removed, the mixing device 10a is carefully attached to the bottle 20 by engaging the threaded female end 16a of device 10a with the threaded end 17 of the juice bottle 20. Screw cap 14a is applied to threaded end 12a to complete the combination of bottle 20 with device 10a. The combination of the bottle with the device 10a threaded thereon, can now be vigorously shaken to effect the dispersion of the solid material in the liquid and then consumed by the user. It should be noted that the combination of the mixing device configured as described according to the invention, and the underlying container constituting one unitary combination is novel and represents an embodiment of the invention.

[0022] The invention is adaptable to an enormous range of materials to be blended without limitation on the materials. For example, liquids as well as powders or other particulate materials may be employed such as medicines, sugar, cocoa, vitamins, flavoring agents, cinnamon, coloring agents, instant coffees, teas, paints, milk, cereals, soup mixes and oils.

[0023] There are numerous variations and other embodiments that maybe employed, some of which are shown in the Figures and others of which will be apparent to those skilled in the art. For example, device 10a can be provided with a puncturable cover such as a very thin film of an aluminum or plastic membrane, initially to separate any materials that may have been shipped with or added to the mixing chamber of the device. The user would then simply engage the device at the exposed entry site 17 of the bottle containing the liquid and then puncture the cover to allow the contents to mix with the liquid below. This step will probably be delayed (at least for liquids to be added) until the mixing device is attached to the neck of the container bottle. Once the device is affixed and the puncturable membrane broken, the vigorous shaking can begin. In dealing with this form of a design, care should be taken to provide puncture means which do not cause disintegration of the punctured membrane, but rather make it easily removable from the liquid to avoid any danger of ingesting the membrane material when and if the contents of the bottle are consumed.

[0024] The puncture can be made with any sharp object by pressing the object through the opening in the upper end of the chamber 12a down through the protective membrane (not shown) while the device is in place on the liquid container at 17.

[0025] One of the objects of the invention is to provide a simple device that is easily manufactured, shipped and used. The inventor sought to achieve this through using available closure means so those in the art would not require any new or special materials to construct or use the device of the invention. Since, in several places, the invention employs various preferred or optional closure means, it is fruitful to discuss some of those at this point. Suitable closure means will at once be apparent to those skilled in the art since they are all
standard and have been or are currently used in closure applications. Thus, there is available for use in this invention, various closure means such as a screw cap of standard configuration and form, a stopper type, notably used in wine bottles or oil or vinegar bottles, such as cork or synthetic stoppers, snap fits in which a cover is easily applied to an opening by a pressure fit and then flipped off as needed, an overfitting lid-type cover such as those used in plastic cups containing liquids such as coffee, tea, soda, water or the like. It should be noted that the device is not limited to mixing ingestible materials. The device could as well be used to mix non-edible materials such as soaps, bath oils, dyes, household products, maintenance products, paints and the like.

[0026] The cover type need not be completely liquid sealable, though it is highly preferred in order to achieve the major advantages of the invention. The sealing that one obtains through screw caps and stoppers and corks and the like is sufficient to permit a vigorous shaking without losing any substantial amount of material. A snap fit, while not being preferred, is also usable.

[0027] The shape of the mixing device is not especially critical to the invention. It can itself be cylindrical, square or rectangular in shape, but the actual shape constitutes no essential component of the invention.

[0028] The mixing device can be shipped empty or filled with the desired material to be mixed such as powdered mixes or sugar for example so that the mixing device could be adaptable to apply to many liquids requiring sweetening.

[0029] The interior volume of the mixing device and thus the size thereof, is largely dependent upon the desires of the ultimate consumer. As noted above, it is preferably greater than the void space defined by the geometry of the closure means on the container of the liquid to be admixed and the volume of that material. Under most circumstances, it is preferred that the volume of the mixing device be greater than the void space in the sealed container provided by the manufacturer. How much larger depends on the ultimate material to be blended, its quantity, how much mixing and room is needed and the like. Suffice it to say that the volume of the mixing space is preferably greater than that of the void space of the container as supplied.

[0030] Depending on the ultimate use of the mixing device, a variety of adapters may be supplied to provide flexibility for attachment to a variety of containers and re-closure sizes. Thus, threaded fittings on the device can be provided with larger or smaller adapters for attachment to the larger or smaller opening sizes of the container to which it is to be attached as desired.

[0031] In an effort to have a greater appreciation for this aspect of the invention, we compare here a container of liquid in which a cork stopper is used as the closure means, with a container having a screw cap as the closure means. In the former case, the cork stopper itself has no volume in which a mixing can occur, while the closure means in the latter case, the screw cap itself has a finite, albeit probably insufficient, volume (herein incremental volume). In addition, the void space below the cork stopper is less than the void space below the screw cap since the stopper protrudes into the bottle neck whereas the screw cap does not. It is therefore desirable for the mixing chamber of the device of the invention to have a greater volume than that of the closure means incremental volume when the mixing device is permanently closed at its upper end to increase the available volume for mixing. It is also within the scope of this invention, however, to provide a mixing chamber volume which is less than, equal to, or greater than the closure means incremental volume supplied with the underlying container when the mixing chamber has a removable upper end as in FIG. 1, opposed to one which is permanently closed as in FIGS. 2 and 3.

[0032] In summary, when configured with a removable upper end closure means as shown in FIG. 1, 12a and 14a the device may have a mixing chamber of any size. When configured as shown in FIGS. 2 and 3 with a permanent, non-removable closure (12b and 12c), the mixing device volume should be greater than that of the closure device supplied with the filled container 20.

[0033] Accordingly, the device of the invention can be characterized as:

[0034] A mixing device adapted for removable attachment to a container capable of containing a first material to be mixed with a second material, said container comprising a material entry site, and closure means theretof, said mixing device comprising a mixing chamber wherein at least a portion of said first material and said second material can be mixed, said device, relative to a vertical plane, comprising an upper end and a lower end, said lower end being adaptable to communicate with said material entry site closure means, and to be re-attachable and re-detachably engageable to the entry site of said container, said upper end comprising a re-openable and re-closable closure means.

[0035] Another embodiment may be described as:

[0036] A mixing device adapted for removable attachment to a container capable of containing a first material to be mixed with a second material, said container comprising a material entry site, and closure means theretof, said mixing device comprising a housing defining a mixing chamber wherein at least a portion of said first material and said second material can be mixed, said device, relative to a vertical plane, comprising an upper end and a lower end, said lower end being adaptable to communicate with said material entry site closure means, and to be re-attachably and re-detachably engageable to the entry site of said container, said upper end comprising a re-openable and re-closable closure means.

[0037] Other embodiments include the foregoing mixing devices wherein the lower end comprises closure means in the form of a female threaded configuration or in the form of a snap fit or pressure fit configuration, for attachment to a container entry site; mixing devices with the upper end in the form of a male threaded configuration engageable with a closure cap having a reciprocally threaded female configuration, or a female threaded opening engageable with a male threaded closure cap, or the upper end is in the form of an open ended configuration, engageable with a snap fit cap or pressure fit stopper configuration to facilitate repeated opening and closing thereof in various combinations thereof depending on the needs of the user.

What is claimed is:

1. A mixing device adapted for removable attachment to a container capable of containing a first material to be mixed with a second material, said container comprising a material entry site, and closure means theretof, said mixing device comprising a mixing chamber wherein at least a portion of said first material and said second material can be mixed,
said mixing device, relative to a vertical plane, comprising an upper end and a lower end, said lower end being adaptable to communicate with said material entry site closure means, and to be re-attachably and re-detachably engageable to the said entry site of said container, said upper end comprising a re-openable and re-closeable closure means.

2. A mixing device adapted for removable attachment to a container capable of containing a first material to be mixed with a second material, said container comprising a material entry site, and closure means thereat, said mixing device comprising a mixing chamber wherein at least a portion of said first material and said second material can be mixed, said device, relative to a vertical plane, comprising an upper end and a lower end, said lower end being adaptable to communicate with said material entry site closure means, and to be re-attachably and re-detachably engageable to the entry site of said container, said upper end being closed.

3. The device of claim 1 wherein the lower end closure means comprises a female thread configuration adapted to be attachable to a male threaded material entry site of said container.

4. The device of claim 3 wherein the upper end closure means comprises a male threaded configuration.

5. The device of claim 4 wherein the upper end additionally comprises a reciprocally threaded cap to engage said male configuration.

6. The device of claim 5 wherein the lower end closure means comprises a male threaded cap configuration to engage the female threaded portion of the closure means.

7. The device of claim 1 wherein the lower end closure means comprises a snap fit or pressure fit closure to engage a reciprocally configured material entry site.

8. The device of claim 7 wherein the lower end comprises a stopper to close the lower end closure means.

9. The device of claim 2 wherein the lower end closure means comprises a female threaded configuration adapted to be attachable to a male threaded material entry site of said container.

10. The device of claim 9 wherein the lower end closure means comprises a male threaded cap configuration to engage the female threaded portion of the closure means.

11. The device of claim 7 wherein the lower end comprises a stopper to close the lower end closure means.

12. The device of claim 2 wherein the lower end closure means comprises a snap fit or pressure fit closure to engage a reciprocally configured material entry site.

13. The device of claim 12 wherein the lower end comprises a stopper to close the lower end closure means.

* * * * *