Sept. 1, 1936. W. JENSEN 2,052,569

LATHER FORMING DEVICE

Filed June 23, 1930 2 Sheets-Sheet 1

Fig. 1

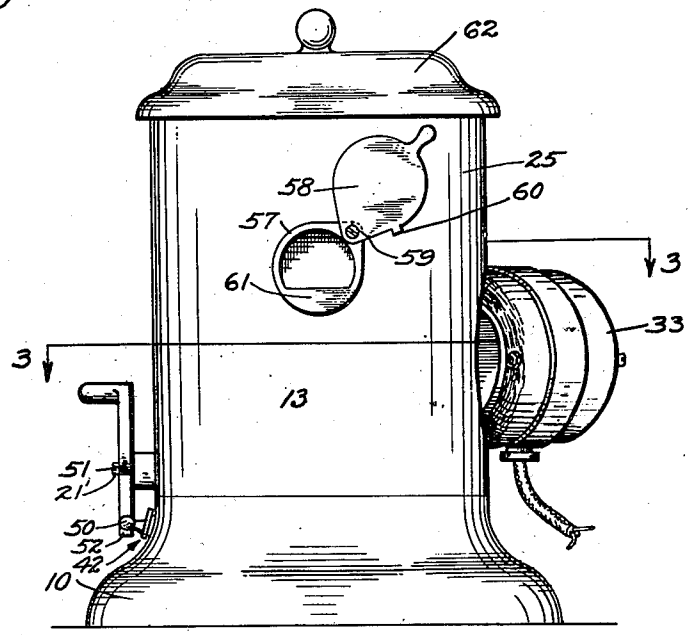

Fig. 2

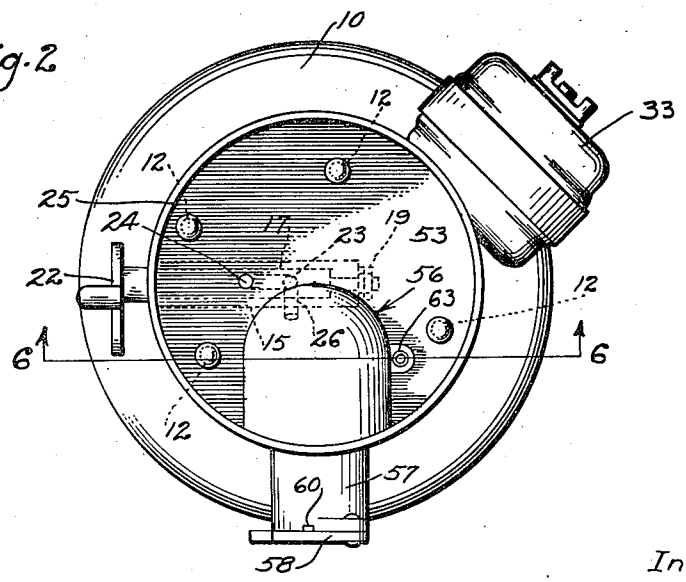

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Fig.3

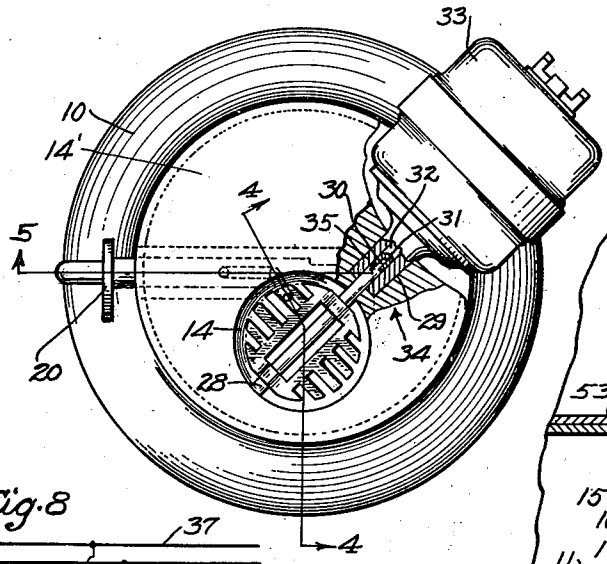


Fig.4

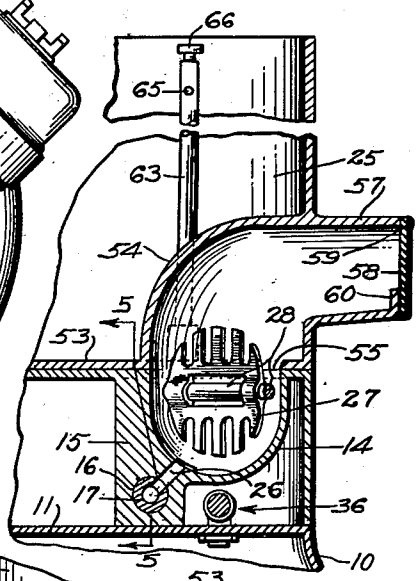
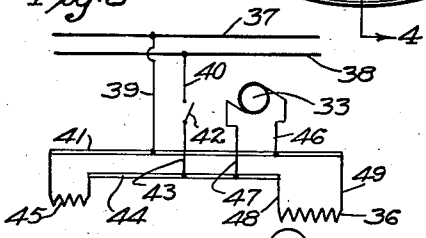


Fig.8



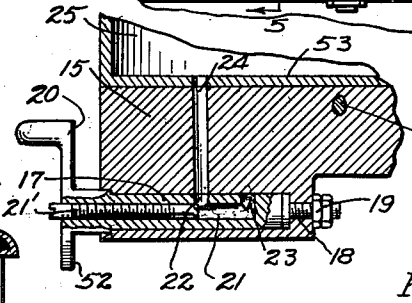


Fig.5

Fig.6

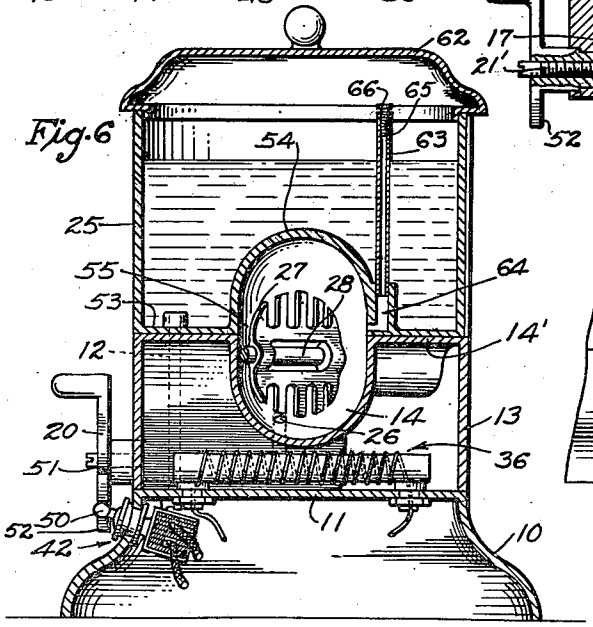
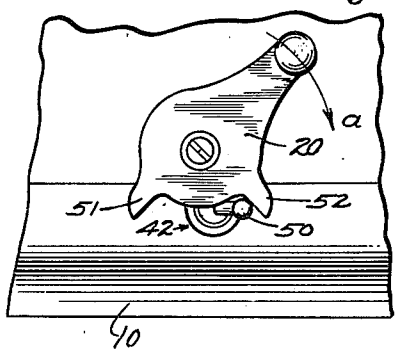


Fig.7



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UNITED STATES PATENT OFFICE

2,052,569

LATHER FORMING DEVICE

William Jensen, Pasadena, Calif., assignor to Electrofoam Corporation, Ltd., Pasadena, Calif., a corporation of California

Application June 23, 1930, Serial No. 463,000

10 Claims. (Cl. 259—46)

This invention relates to agitating apparatus and particularly pertains to a foam forming device of the type generally indicated in my copending application entitled Liquid whipping apparatus, filed February 11, 1929, Serial No. 339,207 now matured into Patent No. 1,782,095 Nov. 18, 1930. In the treatment of various liquids to cause them to be impregnated with air held in association therewith in the form of bubbles, whereby foam or an emulsion is made, such for example as when whipping cream, beating eggs, mixing mayonnaise, or forming soap suds and lather, it is desirable to provide mechanical means within which a quantity of the liquid or material may be placed and from which it may be fed as required, and simultaneously whipped or beaten to form a foam or lather, and it is the principal object of the present invention to provide a simple and compact structure within which foam forming materials may be enclosed in a sanitary and sightly manner, and by which the material may be automatically fed as required incident to a whipping process, and from which the material may be ejected in the form of an emulsion, froth, cream, or suds, and in a cool or heated condition as may be desired.

The present invention in the accompanying drawings has special utility as a producer of shaving lather for use in barber shops, in that it provides a device of small compass which may be filled with a supply of saponaceous liquid and which may be optionally operated by a barber to produce hot lather of a desired consistency as required by him for shaving purposes, and which will eliminate the use of shaving brushes with their lack of sanitation, and will insure that each customer shall be shaved with shaving lather freshly prepared for him and directly applied by the hand of the barber without danger of infection or the transmission of contagious skin infections as might occur by the promiscuous use of a shaving brush.

The present invention contemplates the provision of a closed mixing bowl into which a liquid to be used in forming the product may be fed as required and as controlled by valve mechanism and into which air may be drawn as required for the formation of air bubbles and resulting foam or lather, and which structure is operated by optionally controlled mechanical means, and when desired its action is accompanied by suitable heating of the mixing bowl and its contents.

The invention is illustrated by way of example in the accompanying drawings in which:

Figure 1 is a view in front elevation showing the present invention with the closure for the discharge spout swung to an open position.

Fig. 2 is a view in plan showing the assembled device of Fig. 1 with the closure swung to a closed position over the mouth of the discharge spout, with cover removed.

Fig. 3 is a view in horizontal section as seen on the line 3—3 of Fig. 1 and with parts broken away to more clearly disclose the motor coupling.

Fig. 4 is an enlarged view in vertical section taken on the line 4—4 of Fig. 3 and showing the whipping member within the mixing bowl, the discharge spout therefrom and the valve control inlet thereto.

Fig. 5 is a view in vertical section as seen on the line 5—5 of Fig. 3 and as showing the construction of the liquid control valve.

Fig. 6 is a view in vertical section as seen on the line 6—6 of Fig. 2, and as showing the mixing bowl, the liquid and air inlets thereto, and the heating elements associated therewith.

Fig. 7 is an enlarged view in elevation showing the combined valve and switch control lever.

Fig. 8 is a view in diagram showing the electrical arrangement of the device.

Referring more particularly to the drawings, 10 indicates a base here shown as being circular in shape and having a horizontally extending floor 11 across its top. Mounted above the base and secured thereto by bolts 12 is a mixing unit 13. This unit is in the shape of a cylindrical shell having an upper horizontal wall 14' which is formed integral with a downwardly extending mixing bowl 14 of substantially hemispherical shape. As shown in Fig. 4 of the drawings, a transversely disposed extension 15 is formed along one side of the mixing bowl 14 and is formed with a horizontally extending cylindrical bore 16 to receive a cylindrical valve stem 17. This stem extends horizontally and fits within the bore 16 with a running fit.

The stem, as shown in Fig. 5, is formed at its inner end with a threaded portion 18 receiving lock nuts 19 by which it is held against longitudinal motion while being permitted to rotate within the bore 16. An operating lever 20 is secured at the outer end of the stem for the rotation thereof. The valve stem is formed with a central longitudinally extending passageway 21 having an induction port 22 at a point intermediate its ends and an eduction port 23 adjacent its inner end. The induction port 22 may be caused to register with a supply duct 24 which leads vertically through the member 15 from the supply bowl 25 which will be hereinafter de-

scribed in detail. The eduction port 23 as shown particularly in Fig. 4 of the drawings, communicates with the bowl 14 through a duct 26, at a point near its bottom, and when the ports 22 and 23 of the valve stem are in register with the ducts 24 and 26, respectively, communication will be established from the supply bowl 25 into the mixing bowl 14. Mounted within the mixing bowl and journalled in the walls of the mixing unit 13 is a beater 27 which is carried upon a shaft 28. The beater is substantially circular in contour and is slightly less in diameter than the diameter of the mixing bowl. This member is in the form of a plate extending in a common plane upon opposite sides of the axis of the shaft 28, and is formed with a plurality of fingers which pass through the liquid in the bowl and tend to agitate it and to cause air to be beaten into the liquid whereby it will be entrapped in the form of bubbles and a resulting foam, cream or lather.

An enlarged cylindrical recess 29 is formed in the wall of the mixing unit 13 and into this recess the end of the beater shaft 28 extends. This end of the shaft is formed with a transversely positioned tongue 30 adapted to project into a slot 31 in the end of the armature shaft 32 of the motor 33. The motor is detachably supported with relation to the mixing unit by a coupling 34 which is formed with a sleeve 35 adapted to fit tightly within the recess 29, and which structure is secured to the end of the armature cage of the motor. The length of the sleeve 35 is greater than the length of the armature shaft 32 extending thereinto, and the length of the beater shaft 28 extends into the bore of the sleeve 35 so that its tongue 30 will mesh with the slot in the end of the armature shaft and produce a driving connection therewith. By this means strain is relieved from the driving connection between the motor and the shaft, thus insuring against misalignment of the beater shaft and the armature shaft, and making it possible to instantly remove the motor if desired without manipulation of screws or other attaching means. Disposed within the mixing unit and mounted upon the base 10 is an electrical heating element 36 which extends transversely beneath the bowl 14 and affords heat therefor when liquids are treated which it is desired to heat, such for example, shaving lather. The wiring diagram of the motor and the heating elements are shown in Fig. 8 of the drawings, where 37 and 38 indicate electrical feed wires, and wires 39 and 40 indicate lead in wires. The wire 39 connects with a bus bar 41 and the wire 40 connects with one terminal of a switch 42. The other terminal of this switch is provided with a conductor 43 connecting with bus bar 44. A suitable resistance element 45 is secured in electrical connection across the bus bars 41 and 44. The motor 33 is secured to the bus bars by conductors 46 and 47, respectively. The heating element 36 is secured to the bus bars 41 and 44 by conductors 48 and 49, respectively.

The switch as shown in Figs. 6 and 7 is a snap switch secured through the side wall of the base 10 and having an operating extension 50 which projects beneath the valve lever 20 and may be alternately engaged by lugs 51 and 52 which insure that when the valve stem 17 is rotated to an open position the switch will be closed to establish electric circuits through the motor and the heating element, and that when the valve is moved to a closed position by the lever 20 the switch will be opened to simultaneously interrupt the flow of liquid to the mixing bowl and the flow of current to the motor and the heating element.

The supply bowl 25 is cylindrical in section and is here shown as agreeing in diameter with that of the mixing bowl section 13. A floor 53 is formed in the supply bowl and has a substantially hemispherical top portion 54 which has a lower opening 55 registering with the circular mouth of the mixing bowl 14 and of a diameter substantially equal thereto. The portion 54 thus combines with the mixing bowl 14 to form a closed mixing compartment 56 of circular shape horizontally and of elliptical section vertically, as shown in Fig. 6 of the drawings. A discharge spout 57 communicates with the top of the portion 54, as clearly shown in Fig. 4, and extends outwardly therefrom so that the product which is formed within the mixing compartment 56 may be discharged from the compartment into a suitable container or into the hand of the operator. A closure plate 58 is pivotally secured upon a screw 59 and may swing to an obstructing position over the mouth of the spout 57 where its downward movement is limited by a lug 60.

By reference to Figs. 1 and 4 of the drawings, it will be seen that the lower edge of the mouth of the spout 57 is provided with a lip portion 61 which will tend to cooperate with the plate 58 and completely seal the spout when the closure is in its obstructing position. The supply bowl 25 is provided with a suitable cover 62 which will make it possible for the material to be enclosed within the supply bowl without danger of contamination or deterioration by contact with the atmosphere.

Attention is called to the fact that the compartment 56 within which the beater 27 operates is a closed compartment and that in order to create bubbles in the liquid being acted upon it is necessary to provide means for admitting air to the bowl in measured proportion. This is accomplished by providing an airpipe 63 which extends downwardly through the supply of material within the supply bowl 25 and communicates with the mixing compartment 56 at a point above the level of the liquid therein through a duct 64. An air inlet opening 65 is formed through the side wall of the pipe 63 at a point above the level of the liquid within the supply bowl 25, and the area of the opening is regulated by an adjusting screw 66. This makes it possible to control the amount of air entering the mixing compartment and to thus control the size of the air bubbles being formed and the consistency of the foam or other whipped material produced within the machine.

In order to construct the device so that it will be quite compact and will not require a large amount of space, attention is directed to the fact that the motor is disposed on an angle to the spout so that the structure may be positioned close to a wall along its rear side, or on either of its sides without requiring an additional space equal to the length of the motor. By disposing the beater with its rotary axis at an angle to the center of the spout the feed operation is facilitated.

In operation of the present invention the device is assembled as shown in the drawings with the mixing unit 13 and the supply unit 25 secured in superposed relation to each other and upon the base 10. The supply bowl 25 may then be filled with a liquid to a level slightly less than

that of the opening in the airpipe 63, after which the cover 62 may be placed upon the bowl 25, it being understood that the cover need not fit so tight as to prevent inflow of air to the bowl, or in the event that it is desirable for the cover to fit tight it might be necessary to provide an inlet duct for the air through the cover 62, thus permitting a free flow of both liquid and air to the mixing compartment 56. At this time the valve 17 has been rotated so that its induction and eduction ports 22 and 23 are out of register with the ducts 24 and 26. The adjusting screw 21' may be set within the longitudinal passageway 21 of the valve stem 17 to vary the area of the opening through the induction port 22 and thus control the rate of flow of the liquid from the bowl. When the valve lever 20 is moved in the direction of the arrow "a" as shown in Fig. 7, it will swing the induction and education ports 22 and 23 to register with the ducts 24 and 26, as shown in Fig. 4 of the drawings. During this swinging movement the lug 52 of the lever 20 will engage the switch operating member 50 and swing the switch to a closed position. This will then simultaneously establish a flow of the liquid from the bowl 25 to the mixing compartment 56 and will establish electric circuits through the motor 33 and the heating element 36 along the various conductors as shown in Fig. 8 of the drawings. The beater 27 will then begin rotation within the mixing bowl 14 and will violently agitate and whip the liquid flowing into the bowl through the duct 26. At this time it is desirable to close the mouth of the spout 57 by the plate 58 so that the only air within the compartment will be that supplied through the pipe 63. The plate 58 should remain closed until after the compartment has become filled with the foam, lather, or other such product being whipped in the compartment, after which the plate may then be swung to its open position as shown in Fig. 1, for at that time the product flowing from the bowl will be in sufficient volume to completely fill the spout 57 and obstruct the inflow of air thereto.

As the machine operates the coil 36 will heat the bottom of the bowl 14 and this heat will be imparted to the liquid flowing into the bowl so that the product which is ejected from the spout will be hot, and when the product produced is shaving lather the product will be of a desirable consistency and temperature to be directly applied to the face of a person to be shaved.

It will be recognized that the device here disclosed may be used for other purposes than for shaving lather, such for example, whipping cream, in which case the whipping cream may be placed in the supply bowl 25 and may be continuously fed to the mixing compartment until the entire quantity of cream has been whipped, or may be intermittently used to produce freshly whipped cream as desired. The structure here disclosed also lends itself particularly to desirable conditions of sanitation, since it is possible to readily remove the supply bowl 25 and to clean this bowl, as well as thoroughly clean and sterilize the mixing compartment without danger of injury to any of the parts of the device. In fact, the ease with which the motor may be removed makes it possible to instantly detach the motor so that it will not be harmed by water or other cleaning materials.

It will thus be seen that the structure here disclosed provides a simple, compact, and efficient means for whipping various materials to produce a foam, lather, cream, or the like.

While I have shown the preferred form of my invention, as now known to me, it will be understood that various changes may be made in combination, construction, and arrangement of parts by those skilled in the art without departing from the spirit of the invention as claimed.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a foam forming device, a closed mixing receptacle having a closed spout into which foam collects extending laterally from the upper portion of the receptacle, a liquid zone in the bottom of said receptacle and an unobstructed foam forming zone above the liquid zone in the receptacle, agitating means alternately passing through said zones only of the receptacle for forming foam, and means for controlling the admission of atmospheric air into the receptacle and for directly introducing the air into the foam forming zone.

2. In a foam forming device, a closed mixing receptacle having an upper foam forming zone and a lower liquid zone into which foam forming liquid is delivered, a closed spout into which foam collects extending from the mixing receptacle and communicating with the same at a point above the level of the foam forming liquid, agitating means operating only within the mixing receptacle and alternately passing through said zones for forming foam, the said closed receptacle being provided with a foam forming zone located wholly above the agitating means, and means for controlling the admission of atmospheric air into the receptacle and for directly introducing the air into the foam zone.

3. In a foam forming device, a closed mixing receptacle into which foam forming liquid is delivered, agitating means operating within the mixing receptacle for forming foam and a liquid zone, an unobstructed foam forming zone in said receptacle above the said liquid zone, a closed spout into which the foam collects extending laterally from said receptacle at the foam forming zone thereof, and means for controlling and regulating the amount of atmospheric air admitted directly into the said foam forming zone.

4. A foam forming device comprising a container, the upper portion of which constitutes a supply compartment into which a foam forming liquid is admitted, a closed mixing receptacle in said container extending into and below said supply compartment and having its upper portion extending exteriorly thereof, an agitator in the lower portion only of said mixing receptacle, the interior upper portion of said mixing receptacle being unobstructed, and means for connecting said supply compartment with said closed receptacle adjacent its bottom portion wherein the liquid is agitated to form a foam which passes into the unobstructed upper portion thereof for discharge exteriorly of said container.

5. A foam forming device comprising a container, the upper portion of which constitutes a supply compartment into which a foam forming liquid is admitted, a closed mixing receptacle within said container having an outlet spout terminating from its upper portion and projecting exteriorly thereof, the upper interior portion of said closed receptacle being unobstructed, agitating means in the lower portion of said closed receptacle and motive power means to drive the same, a heating element adjacent said mixing receptacle, valve means to connect the supply compartment with said closed receptacle adjacent its bottom portion, manually controlled

means exteriorly of said container mounted directly on said valve means whereby upon actuation of said manual control means the liquid from said supply compartment is permitted to flow into said closed receptacle adjacent its bottom portion and simultaneously with and by the same actuation aforesaid the motive power means and the heating element are caused to be brought into operation.

6. A foam forming device comprising a receptacle having an outturned spout at its upper end, the mouth of said spout being normally closed to close the receptacle, agitating means disposed within the receptacle and adapted to agitate a body of liquid within the lower portion of said receptacle, means delivering said liquid to said receptacle at a point below the normal level of the accumulated liquid therein, means for regulating the flow of liquid introduced to maintain the liquid at a substantially uniform level, means for introducing air under atmospheric pressure into the receptacle above the normal level of said accumulated liquid, and means for controlling the quantity of air introduced into said receptacle whereby the proportion of air and liquid within the receptacle may be determined and a desired character of foam produced.

7. Means for frothing liquid, including a container for said liquid, a mixing chamber adapted to be closed when aeration takes place and having valved communication with said container; means for adjustably varying the area of said communication; a rotating member in said mixing chamber adapted to agitate said liquid, said chamber having an air inlet debouching substantially coaxial with the axis of rotation of said rotating member and adjacent an end thereof, the entry to said inlet being at an elevation substantially equal to the maximum height of the liquid in the container.

8. A liquid-frothing device, including a liquid container, a closed mixing chamber adjacent to and in communication therewith, a regulable valve between said container and chamber, a rotatable mixer in the mixing chamber, an electric motor therefor, the mixing chamber having an air inlet coaxial with and adjacent the agitator to form a centrifugal inspirator, a manually controlled closure for said chamber through which froth may be dispensed, the admission of air to the mixing chamber being confined to said air inlet only and proportional to the speed of said rotatable mixer while frothing proceeds.

9. In a motor-driven liquid-frothing apparatus, a source of supply of said liquid having a communication with a closed aerating chamber, a horizontal rotatable beater in said chamber, said chamber having a wall provided with an air inlet bore, said bore extending downward to a point substantially coaxial with the centre of rotation of said beater, said inlet debouching into said chamber horizontally through a bore connecting with said vertical bore and coaxial with said beater axis, said entry opening combining with said beater to produce a centrifugal air pump adapted to draw air into the liquid below the surface thereof and in proportion to the rate of commingling the air with the liquid, and a tube forming a continuation of said air inlet bore and extending exteriorly of said chamber.

10. Means for frothing liquid comprising a container for the liquid, a mixing chamber having valved communication with said container, an agitating member in said chamber rotatable on a horizontal axis, and means for the supply of aerating air to said chamber, said means comprising a conduit opening into the chamber substantially in axial alinement with the agitating member and opening to the atmosphere at an elevation approximately equal to the maximum height of the liquid in the container.

WILLIAM JENSEN.