July 1, 1930. R. M. BAGLEY 1,769,904

LIQUID MIXER

Filed Jan. 17, 1929

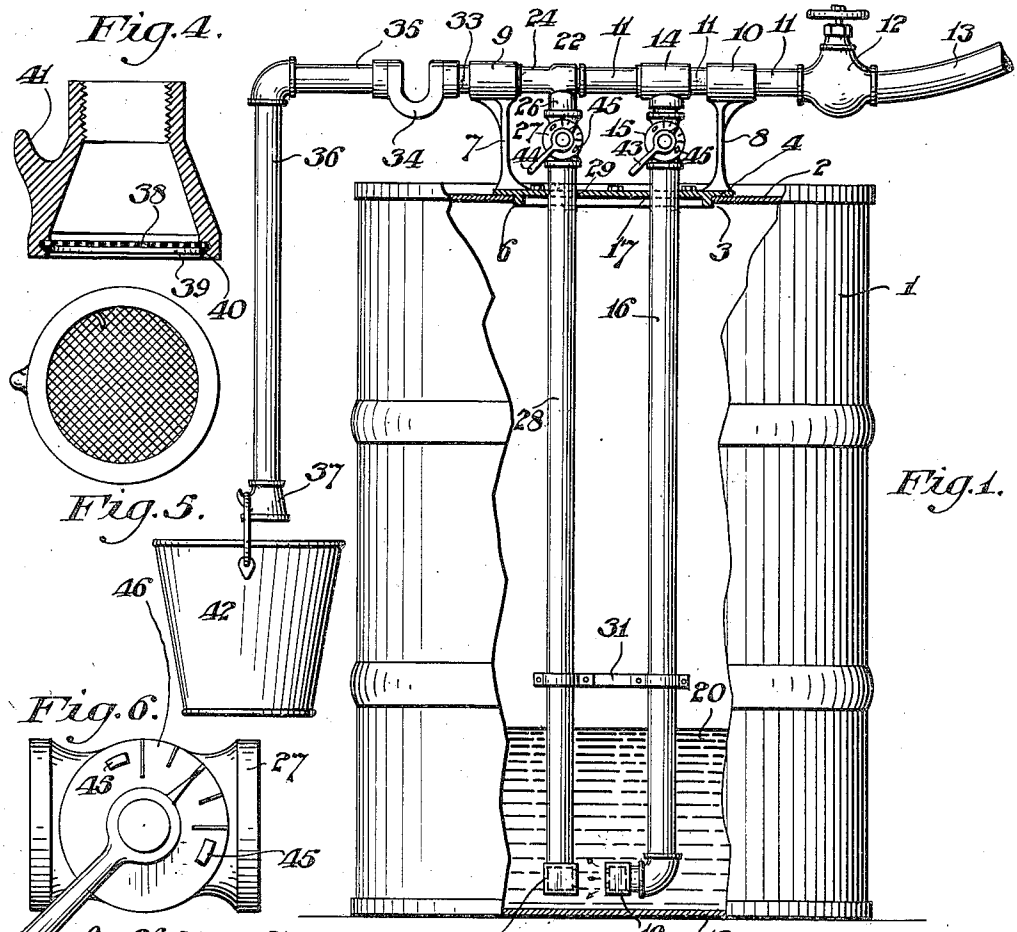


Fig. 1.

Fig. 4.

Fig. 5.

Fig. 6.

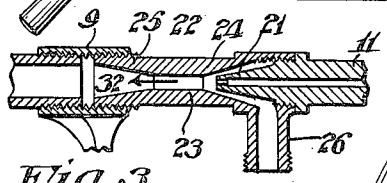


Fig. 3.

Fig. 2.

Fig. 7.

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UNITED STATES PATENT OFFICE

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LIQUID MIXER

Application filed January 17, 1929. Serial No. 333,089.

My invention relates to a new and useful soap mixer and it relates more particularly to a soap mixing device adapted for producing a stream of soap solution of suitable concentration by automatically drawing into a moving stream of water a suitable proportion of a concentrated soap solution so that a stream of soap solution of suitable desired concentration may be discharged from the apparatus.

My invention further relates to a novel soap mixer which is adapted to be attached directly to a water supply line and to be inserted into a suitable container, such as a steel drum or the like, containing a soap paste, that is, a semi-fluid soap, whereby said soap paste may be first thoroughly liquefied or reduced to a concentrated soap solution by the automatic addition of a suitable proportion of water and whereby said liquefied soap or concentrated soap solution may then be automatically drawn into the moving stream of water in suitable proportion so as to convert the entire stream of water into a corresponding stream of soap solution of suitable and desired concentration.

With the above ends in view, my invention consists of a novel construction including a base panel having mounted thereon a liquid jet vacuum pump of the Venturi type, to one end of which a water supply line may be attached.

My invention further consists in a novel combination of the liquid jet vacuum pump mounted on said base panel, a soap intake conduit extending from said vacuum device within proximity of the bottom of the soap reservoir or drum and having a suitable control valve therein and a water supply conduit also having a control valve therein communicating with the main water supply line in advance of said vacuum device and extending within proximity of the terminal of the soap intake conduit.

In the accompanying drawings in which like reference characters indicate like parts,

Figure 1 represents a general front elevation of my novel soap mixer shown mounted on a drum of soft soap or soap paste, ready for use.

Figure 2 represents a top plan view of the same.

Figure 3 represents a vertical longitudinal section, on an enlarged scale, of the liquid jet vacuum device, taken generally on line 3—3 of Figure 2.

Figure 4 represents a vertical section, also on an enlarged scale, of the strainer head at the discharge end of my novel soap mixer.

Figure 5 represents a bottom elevation of the same.

Figure 6 represents a front elevation, on an enlarged scale, of one of the control valves.

Figure 7 represents fragmentary, sectional elevation of a valve control of a modified construction embodying my invention.

For the purpose of illustrating my invention I have shown in the accompanying drawings forms thereof which are at present preferred by me, since the same have been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of the instrumentalities as herein shown and described.

In carrying out my invention I utilize any standard container 1 for storing the soap paste. This soap container 1 may be, and preferably is, the original steel drum in which the soap paste is shipped and supplied so as to save unnecessary handling or re-storing of the soap paste. The standard steel drum 1 is normally provided at its top 2 with a suitable opening 3, onto which the base or panel 4 of my novel soap mixer is adapted to be mounted and secured. Thus, upon the removal of the usual cover from the top opening 3 of the drum, the panel 4 of my device is mounted in place of said cover and serves again to close the drum. A series of bolts 5 may be employed for rigidly securing the panel 4 to the top 2 of the drum.

The panel 4 is provided at its bottom with an annular rib or projection 6 which fits into the opening 3 so as to align the panel with said opening. A pair of diametrically opposed upright standards or brackets 7 and

8 are provided on top of the panel 4, either secured thereto or formed integrally therewith.

Each of the upright standards 7 and 8 terminates in horizontal tubular supports 9 and 10, respectively. Within the tubular support 10 the water supply pipe 11 is mounted, having at its receiving end any suitable valve 12, to the other side of which any suitable pipe or hose 13 may be attached for connection with the water main or supply.

By means of the T connection 14 a graduated control valve 15 is connected to the water supply pipe 11 and to the lower end of the control valve 15 the water supply pipe 16 is connected. The pipe 16 extends through a suitable opening 17 in the panel 4 and extends downwardly within proximity of the bottom 18 of the drum 1 where it preferably terminates in a cap 19 having a suitable number of small perforations for more uniformly distributing the water in the mass of soap paste 20.

The main water supply pipe 11 terminates in a nozzle 21 within the vacuum pump device 22, in operative juxtaposition to the constriction 23 in the main body 24. The discharge end 25 of the body 24 of the vacuum pump is threaded into the tubular bushing 9 on top of the upright bracket 7. The intake 26 is provided in proximity to the nozzle 21. The graduated control valve 27 is connected onto the vacuum intake 26 and to the other end of the valve 27 the soap intake pipe 28 is secured. The soap intake valve 28 projects from a suitable opening 29 in the panel or closure member 4 and extends down within proximity of the bottom 18 of the drum. The soap intake pipe 28 also preferably terminates in a suitably perforated cap 30 to act as a strainer for preventing any semi-solid lumps of soap paste being drawn into the pipe 28. The auxiliary water supply pipe 16 and the soap intake pipe 28 terminate at the bottom of the drum or tank 1 in close proximity to each other. The pipes 16 and 28 may be secured to each other by a suitable brace or yoke 31 for maintaining their lower terminals in fixed relation to each other.

The jet of water issuing from the nozzle 21 and passing through the constriction 23 in the direction of the arrow 32 creates suction within the intake 26 and the pipe 28 so as to draw soap solution through said pipe and intake into the main stream of water. The soap solution thus produced is discharged through the pipe 33 and U-shaped trap 34 and the horizontal pipe 35 and the vertical pipe 36 terminating in a strainer head 37.

The strainer head 37 is somewhat enlarged at the bottom and is provided with a transverse screen 38 retained in the bottom thereof by means of an expanding wire ring 39 seated in a suitable internal annular groove 40 within said strainer head. The screen 38 prevents the discharge of any solid or semi-solid lumps of undissolved soap. A suitable hook 41 is preferably formed integral with the strainer head 37 and provides a support for the bucket 42 or the like, into which the soap solution is discharged for ultimate use.

The control valves 15 and 27 are preferably of the plug type, provided with handles 43 and 44, respectively, and suitable stop projections 45 and indicator dials 46 for gauging the amount of water admitted to the bottom of the mass of soap paste and for gauging the amount of soap solution drawn into the main water stream.

The U-shaped trap 34 serves to seal the discharge end of the vacuum device 22 with a body of liquid so as to insure the instant operation of said device at any time. In operating my novel soap mixer the same is merely mounted upon any standard drum containing a soft soap or soap paste 20. It is merely necessary to force the two pipes 16 and 28 down through the mass of soap and then to clamp or secure the head or panel 4 over the opening in the top of the drum. This may be effected by the series of bolts 5. The soap mixer thus mounted upon a drum remains there until the soap in the drum has been entirely consumed when the soap mixer is removed from the drum and again mounted onto a full drum of soap.

After having mounted the soap mixer on a drum of soap the main shut-off valve 12 is opened so as to admit a supply of water through the mixer. With the control valves 15 and 27 both closed, the supply of water admitted through the main shut-off valve 12 will be discharged through the strainer head 37 in its original condition.

In order to produce the desired soap solution, a suitable small stream of auxiliary water supply is admitted through the valve 15, and pipe 16 into the bottom of the soap mass 20, in proximity to the terminal 30 of the soap intake pipe 28. This auxiliary water supply liquefies the soft soap or soap paste so as to form a concentrated soap solution which may be drawn into the pipe 28 by the suction created within the vacuum device 22. By opening the valve 27 to a suitable extent, a desired amount of the concentrated soap solution is drawn into the stream of water passing through the vacuum device 22 so as to produce a soap solution of suitable and desired concentration.

In Figure 7 I have illustrated a slightly modified form of construction embodying my invention, whereby the valve 27 shown in Figures 1 and 2 is replaced by a valve 47, also preferably of the plug type having a main port 48 for connecting the pipe 28 with the intake 26 of the vacuum device 22 and having also an auxiliary port 49 in the plug thereof for connecting two stationary ports 50 and 51 in the body of said valve. The

auxiliary water supply pipe 52 is connected to the stationary port 50 and the pipe 16 is then connected to the other stationary port 51 through a pipe 53 and the needle control valve 54. By this means the auxiliary water supply to the pipe 16 is automatically shut off whenever the soap intake is shut off, so that the drum may not be accidentally flooded with water through the auxiliary water supply line. The needle control valve 54, or a valve similar to the valve 15, serves to control the amount of water admitted into the tank for liquefying the soap.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

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

1. A mixing device of the character stated, comprising a main water conduit terminating in a liquid jet vacuum pump and an auxiliary water supply pipe communicating with said main water supply conduit in advance of said vacuum pump and terminating in operative juxtaposition to the terminal of the intake of said vacuum pump.

2. A mixing device of the character stated, comprising a main liquid conduit having its discharge end connected to the nozzle of a liquid jet vacuum pump, an auxiliary liquid conduit communicating with said main liquid conduit and extending within proximity of the vacuum intake of said liquid jet vacuum pump and a valve to control the auxiliary stream of liquid discharged through said auxiliary liquid conduit in proximity of the vacuum intake of said vacuum pump.

3. A mixing device of the character stated, comprising a main liquid conduit, a suction creating device operatively connected with said conduit and adapted to be operated by liquid passing through said conduit to draw into the stream of liquid in said conduit another liquid to be mixed therewith, and an auxiliary liquid conduit leading from said main liquid conduit to a point in proximity of the suction intake of said suction creating device and adapted to supply an auxiliary liquefying stream in proximity of said suction intake.

4. A mixing device of the character stated, comprising a main liquid conduit, a suction creating device operatively connected with said conduit and adapted to be operated by liquid passing through said conduit to draw into the stream of liquid in said conduit another liquid to be mixed therewith, an auxiliary liquid conduit leading from said main liquid conduit to a point in proximity of the suction intake of said suction creating device and adapted to supply an auxiliary liquefying stream in proximity of said suction intake, and means to control the rate of passage of liquid through said auxiliary liquid conduit.

5. A mixing device of the character stated, comprising a main liquid conduit, a suction creating device operatively connected with said conduit and adapted to be operated by liquid passing through said conduit to draw into the stream of liquid in said conduit another liquid to be mixed therewith, an auxiliary liquid conduit leading from said main liquid conduit to a point in proximity of the suction intake of said suction creating device and adapted to supply an auxiliary liquefying stream in proximity of said suction intake, and means to control the rate of passage of liquid through the suction intake of said suction creating device.

6. A mixing device of the character stated, comprising a main liquid conduit, a suction creating device operatively connected with said conduit and adapted to be operated by liquid passing through said conduit to draw into the stream of liquid in said conduit another liquid to be mixed therewith, an auxiliary liquid conduit leading from said main liquid conduit to a point in proximity of the suction intake of said suction creating device and adapted to supply an auxiliary liquefying stream in proximity of said suction intake, means to control the rate of passage of liquid through said auxiliary liquid jet, and means to control the rate of passage of liquid through the suction intake of said suction creating device.

7. A soap mixer of the character stated, adapted to be mounted on any suitable container containing a soft soap, comprising a head adapted to be mounted on said container, a main water supply pipe mounted on said head and connected to the nozzle of a liquid jet vacuum pump mounted on said head, a suction intake pipe connected to said vacuum pump and extending within proximity of the bottom of said container and adapted to take in liquid from the bottom of said container, and an auxiliary liquefying water supply pipe extending from said main water supply pipe into proximity of the terminal of said intake pipe and adapted to supply a stream of water to liquefy the soft soap in proximity of the intake of said vacuum pump.

8. A soap mixer of the character stated adapted to be mounted on any suitable container containing a soft soap, comprising a head adapted to be mounted on said container, a main water supply pipe mounted on said head and connected to the nozzle of a liquid jet vacuum pump mounted on said head, and intake pipe connected to said vacuum pump and extending within proximity of the bot-

tom of said container and adapted to take in liquid from the bottom of said container, an auxiliary liquefying water supply pipe extending from said main water supply pipe into proximity of the terminal of said intake pipe and adapted to supply a stream of water to liquefy the soft soap in proximity of the intake of said vacuum pump, and a valve to control the amount of auxiliary liquefying water supplied to said vacuum intake.

9. A soap mixer of the character stated, adapted to be mounted on any suitable container containing a soft soap, comprising a head. adapted to be mounted on said container, a main water supply pipe mounted on said head and connected to the nozzle of a liquid jet vacuum pump mounted on said base, an intake pipe connected to said vacuum pump and extending within proximity of the bottom of said container and adapted to take in liquid from the bottom of said container, an auxiliary liquefying water supply pipe extending from said main water supply pipe into proximity of the terminal of said intake pipe and adapted to supply a stream of water to liquefy the soft soap in proximity of the intake of said vacuum pump, and a valve to control the rate of intake of said vacuum pump.

10. A soap mixer of the character stated adapted to be mounted on any suitable container containing a soft soap, comprising a head adapted to be mounted on said container, a main water supply pipe mounted on said head and connected to the nozzle of a liquid jet vacuum pump mounted on said base, an intake pipe connected to said vacuum pump and extending within proximity of the bottom of said container and adapted to take in liquid from the bottom of said container, an auxiliary liquefying water supply pipe extending from said main water supply pipe into proximity of the terminal of said intake pipe and adapted to supply a stream of water to liquefy the soft soap in proximity of the intake of said vacuum pump, a valve to control the amount of auxiliary liquefying water supplied to said vacuum intake, and a valve to control the rate of intake of said vacuum pump.

11. In a device of the character stated, the combination with a reservoir for containing a supply of soap, of a soap mixing device comprising a head adapted to fit over the opening of the container and to act as a closure therefor, a main water supply pipe mounted on said head and adapted for connection to a source of water supply, a suction producing device mounted on said head and above the body of soap in said reservoir and connected to said main water pipe and adapted to be operated by a stream of water passing through said pipe, and an intake pipe connected to and extending from the intake of said suction producing device into the mass of soap in said reservoir and terminating within proximity of the bottom of said reservoir for drawing into the stream of water passing through said main water pipe a suitable proportion of soap.

12. In a device of the character stated, the combination with a reservoir for containing a supply of soap, of a soap mixing device comprising a head adapted to fit over the opening of the container and to act as a closure therefor, a main water supply pipe mounted on said head and adapted for connection to a source of water supply, a suction producing device mounted upon and above said head and above the body of soap in said reservoir and connected to said main water pipe and adapted to be operated by a stream of water passing through said pipe, and an intake pipe connected to and extending from the intake of said suction producing device into the mass of soap in said reservoir and terminating within proximity of the bottom of said reservoir for drawing into the stream of water passing through said main water pipe a suitable proportion of soap.

13. In a device of the character stated, the combination with a reservoir for containing a supply of soap, of a soap mixing device comprising a head adapted to fit over the opening of the container and to act as a closure therefor, a main water supply pipe mounted on said head and adapted for connection to a source of water supply, a suction producing device mounted on said head and above the body of soap in said reservoir and connected to said main water pipe and adapted to be operated by a stream of water passing through said pipe, an intake pipe connected to and extending from the intake of said suction producing device into the mass of soap in said reservoir and terminating within proximity of the bottom of said reservoir for drawing into the stream of water passing through said main water pipe a suitable proportion of soap, and an auxiliary liquefying water supply pipe extending from said main water pipe into the mass of soap in said reservoir and terminating in proximity of the terminal of said intake pipe.

14. In a device of the character stated, the combination with a reservoir for containing a supply of soap, of a soap mixing device comprising a head adapted to fit over the opening of the container and to act as a closure therefor, a main water supply pipe mounted on said head and adapted for connection to a source of water supply, a suction producing device mounted upon and above said head and above the body of soap in said reservoir and connected to said main water pipe and adapted to be operated by a stream of water passing through said pipe, an intake pipe connected to and extending from the intake of said suction producing device into the mass of

soap in said reservoir and terminating within proximity of the bottom of said reservoir for drawing into the stream of water passing through said main water pipe a suitable second proportion of soap, and an auxiliary liquefying water supply pipe extending from said main water pipe into the mass of soap in said reservoir and terminating in proximity of the terminal of said intake pipe.

15. The combination with a reservoir adapted to contain a supply of soap, of a soap mixing device adapted to be extended through the opening of said reservoir and to be mounted therein, comprising a main water line adapted to be connected at one end to a source of water supply and adapted to discharge at its other end, a suction producing device in said water line intermediate of the receiving and discharge ends thereof and adapted to be operated by the stream of water passing therethrough, said suction producing device having its intake positioned within said reservoir near the bottom thereof for drawing into said stream of water a supply of soap.

16. The combination with a reservoir adapted to contain a supply of soap, of a soap mixing device adapted to be extended through the opening of said reservoir and to be mounted therein, comprising a main water line adapted to be connected at one end to a source of water supply and adapted to discharge at its other end, a suction producing device in said water line intermediate of the receiving and discharge ends thereof and adapted to be operated by the stream of water passing therethrough, said suction producing device having its intake positioned within said reservoir near the bottom thereof for drawing into said stream of water a supply of soap, and an auxiliary water line connected with said main water line and terminating near the intake of said suction producing device for supplying a liquefying stream of water into the mass of soap in proximity of said intake.

17. The combination with a reservoir adapted to contain a supply of soap, of a soap mixing device adapted to be extended through the opening of said reservoir and to be mounted therein, comprising a main water line adapted to be connected at one end to a source of water supply and adapted to discharge at its other end, a suction producing device in said water line intermediate of the receiving and discharge ends thereof and adapted to be operated by the stream of water passing therethrough, said suction producing device having its intake positioned within said reservoir near the bottom thereof for drawing into said stream of water a supply of soap, an auxiliary water line connected with said main water line and terminating near the intake of said suction producing device for supplying a liquefying stream of water into the mass of soap in proximity of said intake, and means to control the supply of water through said auxiliary water line.

18. The combination with a reservoir having an opening adapted to contain a supply of soap, of a soap mixing device adapted to be extended through said opening in said reservoir and to be mounted therein, comprising a main water line disposed above the level of soap supply and being adapted to be connected to a source of water supply and being adapted to discharge at its other end, and a suction producing device in said main water line also positioned above the level of said soap supply and having its intake positioned below the level of said soap supply.

19. The combination with a reservoir having an opening adapted to contain a supply of soap, of a soap mixing device adapted to be extended through said opening in said reservoir and to be mounted therein, comprising a main water line disposed above the level of soap supply and being adapted to be connected to a source of water supply and being adapted to discharge at its other end, a suction producing device in said main water line also positioned above the level of said soap supply and having its intake positioned below the level of said soap supply, and an auxiliary liquefying water line connected with said main water line and terminating below the level of said soap supply in proximity of said intake.

20. The combination with a reservoir having an opening adapted to contain a supply of soap, of a soap mixing device adapted to be extended through said opening in said reservoir and to be mounted therein, comprising a main water line disposed above the level of soap supply and being adapted to be connected to a source of water supply and being adapted to discharge at its other end, a suction producing device in said main water line also positioned above the level of said soap supply and having its intake positioned below the level of said soap supply, an auxiliary liquefying water line connected with said main water line and terminating below the level of said soap supply in proximity of said intake, and means to control said auxiliary water supply and said soap intake.

21. A soap mixer of the character stated, adapted to be used in combination with a receptacle containing soap, said soap mixer including a main water line adapted to be connected at one end to a source of water supply, a suction producing device operable by the stream of water passing through said main water line; said suction device having its suction intake positioned within the soap in the receptacle, and being thereby adapted to draw into said stream of water a supply of soap, means for supplying a stream of water into the soap in the receptacle, in proximity of said suction intake, to dilute the

soap in the vicinity of the said suction intake, and a single manually operable valve for simultaneously stopping the intake of said soap supply and the flow of said diluting stream of water, thereby to cause a discharge of soap-free water.

22. A soap mixer of the character stated, adapted to be used in combination with a receptacle containing soap, said soap mixer including a main water line adapted to be connected at one end to a source of water supply, a suction producing device operable by the stream of water passing through said main water line; said suction device having its suction intake positioned within the soap in the receptacle, and being thereby adapted to draw into said stream of water a supply of soap, means for supplying a stream of water into the soap in the receptacle, in proximity of said suction intake, to dilute the soap in the vicinity of the said suction intake, and a manually operable valve for stopping the intake of said soap supply and the flow of said diluting stream of water, thereby to cause a discharge of soap-free water.

23. The combination with a reservoir adapted to contain a supply of soap, of a soap mixing device adapted to be extended through the opening of said reservoir and to be mounted therein, comprising a main water line adapted to be connected at one end to a source of water supply and adapted to discharge at its other end, a suction producing device in said water line intermediate of the receiving and discharge ends thereof and adapted to be operated by the stream of water passing therethrough, said suction producing device having its intake positioned within said reservoir near the bottom thereof for drawing into said stream of water a supply of soap, an auxiliary water line connected with said main water line and terminating near the intake of said suction producing device for supplying a liquefying stream of water into the mass of soap in proximity of said intake, and means to control the water through said main water line.

24. The combination with a reservoir having an opening adapted to contain a supply of soap, of a soap mixing device adapted to be extended through said opening in said reservoir and to be mounted therein, comprising a main water line disposed above the level of soap supply and being adapted to be connected to a source of water supply and being adapted to discharge at its other end, a suction producing device in said main water line also positioned above the level of said soap supply and having its intake positioned below the level of said soap supply, an auxiliary liquefying water line connected with said main water line and terminating below the level of said soap supply in proximity of said intake, and means to control said main water line, said auxiliary water supply and said soap intake.

In testimony whereof I have hereunto set my hand.

ROBERT M. BAGLEY.