

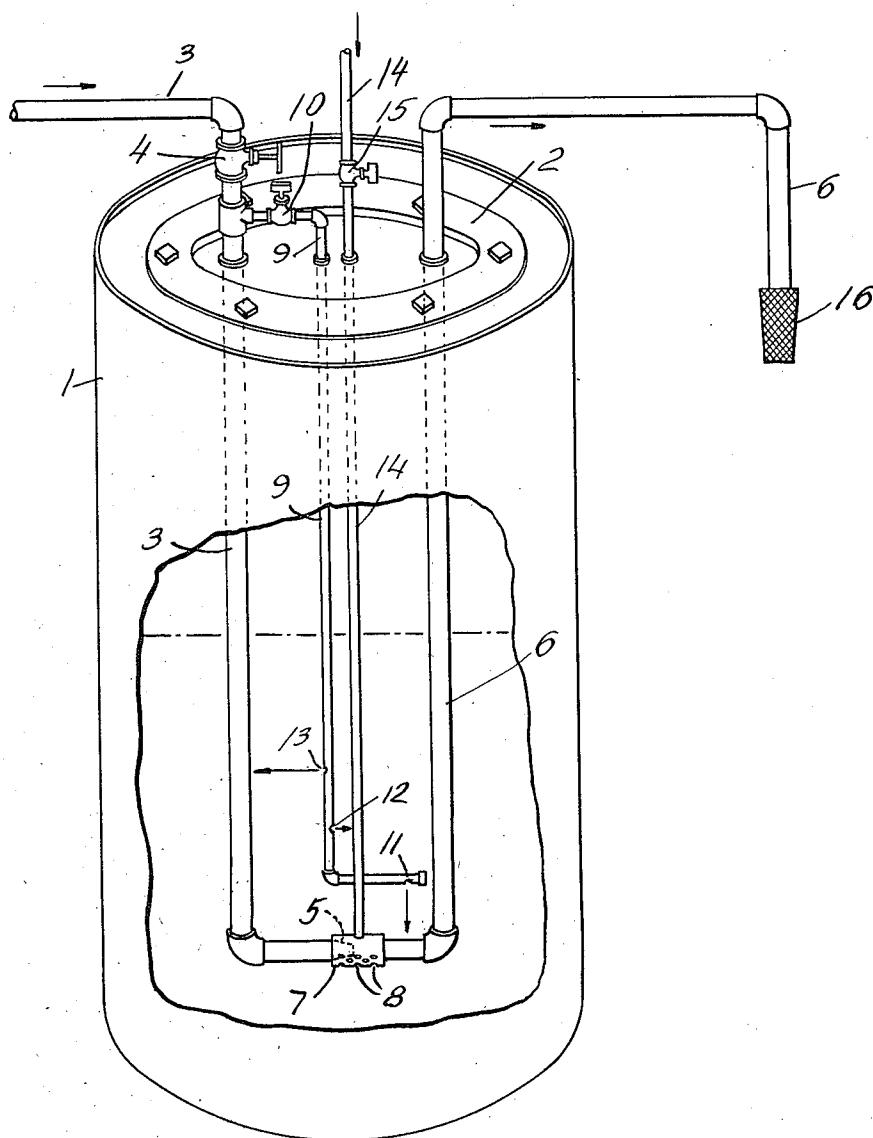
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METHOD AND APPARATUS FOR HANDLING SOAPS AND THE LIKE

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METHOD AND APPARATUS FOR HANDLING
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This invention relates to a method and apparatus for handling soaps. The apparatus of the invention is also adapted for the handling of other solid and semi-solid materials which it is desired to convert into a solution, emulsion or colloidal suspension. The invention further provides a novel process and apparatus for converting solid, semi-solid or liquid soaps into a suds of uniform but readily controllable concentration and consistency.

The invention is especially adapted to the handling of so-called soft soaps and provides a novel process and apparatus whereby such materials may be dispensed from bulk containers either continuously or intermittently, in the form of uniformly dense suds of any desired consistency ready for immediate use and entirely free from particles of undissolved soap which are undesirable because they tend to adhere to the surfaces to which the suds may be applied and are difficult to remove therefrom.

The apparatus of the invention is of simple and cheap though rugged construction and is exceptionally simple to operate. The process and apparatus of the invention as applied to the dispensing of soaps and similar materials permits them to be instantaneously converted to a form in which they can be most advantageously used in any quantity desired for immediate use, thereby promoting more economical use of such materials and materially reducing waste.

The invention will be further described in connection with the accompanying drawing which illustrates in elevation and with parts broken away, one form of apparatus embodying the invention and adapted to carry out the improved process of the invention, but it is intended and will be understood that this further description and illustration are for the purposes of exemplification and the invention is not limited thereto.

Referring to the drawing, a bulk container 1 having a relatively large removable end-cover is shown. No special size or shape container is required, the form illustrated being a standard drum or barrel of the type generally employed for storing or transporting solid or semi-solid materials. The container 1 is provided with a cover plate 2 arranged to close the opening in the upper end of the container and adapted to support the inlet member 3 and outlet member 6, which extend through the cover plate 2 to a point near the lower end of the container 1. Inlet member 3, which may be connected to any suitable means for supplying hot or cold water

or other liquid under pressure is provided with a control valve 4 and a branch connection 9. The inlet member 3 and outlet member 6 are connected at their lower ends with a mixer 7 having a number of perforations 8, located preferably on the lower side thereof. A nozzle 5 is provided at the discharge of the inlet member which extends approximately to the center of the mixer 7. Branch connection 9 is preferably connected as shown on the discharge side of the control valve 4 and provided with an independent control valve 10. This branch connection 9 extends through the cover plate 2 to a short distance above the mixer 7 and is provided with a number of perforations 11, 12 and 13 near its lower end which are preferably arranged so that liquid discharged therefrom will be directed toward the inlet and outlet members. Other perforations may also be provided in the branch connection 9 so arranged as to direct jets of liquid to other parts of the container. An air inlet pipe 14, having a control valve 15, extends through and is supported by the cover plate 2. This air inlet pipe 14 is connected at its lower end to the mixer 7. The discharge end of the outlet member 6 may be provided, as shown, with a suitable screen or strainer 16, if desired.

In the operation of the apparatus illustrated in the drawing to produce suds from a soft soap within container 1, water is supplied to the inlet member 3 under pressure and is forced through the jet 5. The flow of water through jet 5, controlled by the valve 4, creates a region of low pressure within the mixer 7. A regulated amount of water is by-passed through branch connection 9 and injected into the container through the perforations at the lower end of this pipe. The water so introduced to the container dissolves the soap and accumulates as a pool of concentrated soap solution at the bottom of the container. The upper surface of this pool is maintained above the level of the perforations in the mixer 7. By arranging the perforations 11, 12 and 13 so as to direct the stream of water emitted therefrom toward the inlet and outlet members and the air pipe 14, a liquid seal is formed which prevents air from being drawn downwardly through channels which may be formed by insertion of these pipes into the semi-solid soap mass. If the character of the material to be handled is such that it tends to cake or adhere to the walls of the upper portion of the container, branch connection 9 may advantageously be perforated in such a manner as to distribute jets of liquid

about the interior of the container so that the caked or adherent material will be dissolved and washed down to the lower portion. The low pressure created within the mixer 7 by the jet 5 causes the soap solution in which the mixer is immersed to be drawn through perforations 8 from whence it is discharged by the force of the jet through the outlet member 6 together with the additional water supplied by the jet. Air may also be drawn into the mixer 7 through the air inlet pipe 14 and the soap solution and air together with the additional water supplied by the nozzle 5 are intimately admixed so as to form a dense suds in their passage upwardly through the discharge member 6. Any particles of undissolved soap which may have been drawn through the perforations 8, for example when such particles are forced through the perforations 8 when the mixing device is inserted in a fresh container, may be caught by the screen or strainer 16. In normal operation, however, the strainer is not necessary. The relative amounts of water, soap and air may be regulated by adjusting valves 4, 10 and 15 and when a satisfactory adjustment of the valves 10 and 15 is obtained the operation may be entirely discontinued or resumed by operation of the valve 4 alone.

If the apparatus is to be operated intermittently to dispense only relatively small quantities of material at one time branch connection 9 is not essential, as when the valve 4 is closed the inlet member 3, below valve 4, and the outlet member 6 will drain into the bottom of the container 1 forming a pool of sufficient capacity to permit satisfactory operation of the apparatus to be resumed and carried on for a short time without separately introducing additional water directly to the container.

When accurate regulation of the ratio of soap or other semi-solid material to water or other liquid is not essential, the branch connection 9 may be eliminated even if the apparatus is to be operated continuously and the liquid necessary to provide the concentrated solution supplied to the mixer 7 introduced to the container 1, for example, through perforations in the lower end of the inlet member 3. However, when the latter arrangement is employed it is impossible to independently control the amount of liquid introduced directly into the container and the amount of liquid supplied to the nozzle 5, and care must be taken that the perforations are small enough to prevent a greater amount of liquid being introduced directly to the container than can be removed by the action of the jet. Similarly the branch connection 9 is not essential in handling a liquid soap as in handling a soap or other material already in the liquid form it is not necessary to separately introduce water or other liquid directly to the container.

In employing the apparatus of the invention for handling a soft soap or other semi-solid or solid material where it is desired to deliver the final product as a solution or emulsion rather than as a froth or suds the air pipe 14 may be closed or entirely eliminated and the concentration of the solution controlled by regulation of valves 4 and 10, increasing the flow of liquid through branch connection 9 relative to the flow of liquid through nozzle 5 to increase the concentration of the solution.

The apparatus of the invention may be fabricated almost entirely from standard equipment and is exceptionally compact. By connecting the inlet member 3 with a source of liquid supply

through a flexible connection the entire assembly may be removed with the cover-plate 2 and inserted in a new container without disturbing the adjustment of the various parts or without disconnecting the inlet member from the source of liquid supply.

Other advantages of the process and apparatus of the invention are that it is not necessary for the container to be under pressure or vacuum. Accordingly, no special container constructed to withstand pressure or vacuum is required and an absolutely tight seal between the cover-plate 2 and the container is not necessary.

I claim:

1. An improved method of handling soaps and the like, comprising supplying a liquid under pressure to a low-pressure zone and discharging said liquid into said zone as a high velocity jet whereby a region of low pressure is created around said jet, and causing a concentrated solution of the soap and a regulated quantity of gas to be drawn into said region of low pressure and intimately admixed with said liquid to form a dense suds by the action of the jet.

2. An improved method of handling soaps and the like, comprising introducing a solvent liquid in a restricted amount into a body of the soap to form a concentrated solution of soap and liquid, supplying an additional quantity of liquid under pressure to a low-pressure zone and discharging said liquid into said zone as a high velocity jet, whereby a region of low pressure is created around said jet, and causing the said concentrated solution and a regulated quantity of gas to be drawn into said region of low pressure and intimately admixed with the additional quantity of liquid to form a dense suds by the action of the jet.

3. 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.

4. 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.

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, 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.

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, and means to control the rate of passage of liquid through said auxiliary liquid conduit.

7. 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.

8. 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.

9. 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 res-

ervoir 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.

10. 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.

11. 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.

12. In a system for making a soapy solution, passing a stream of liquid through a passageway, contacting a portion of the stream in a chamber with material to be dissolved and thereby forming a solution, utilizing suction created by a second portion of the stream for sucking the solution through a second passageway arranged within the chamber, introducing air into a medial portion of said second passageway, and mixing said air and solution with the second portion of the stream.

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