

United States Patent

[11] 3,604,630

[72] Inventor **Nick Conti**
1954 N. Holliston Ave., Pasadena, Calif.
91104
[21] Appl. No. **21,772**
[22] Filed **Mar. 23, 1970**
[45] Patented **Sept. 14, 1971**

3,402,771 9/1968 Frey 169/15
3,419,082 12/1968 O'Regan et al. 239/553.3 X
3,482,638 12/1969 Barnes 169/15

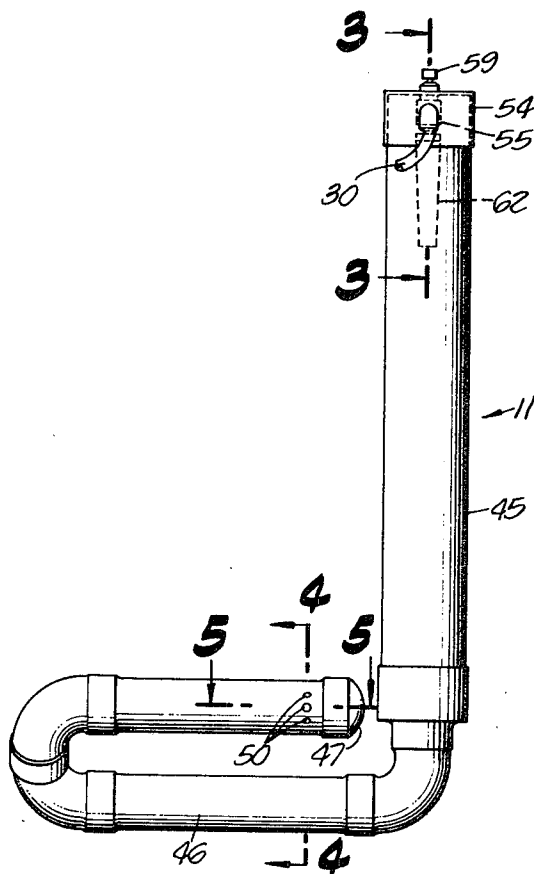
Primary Examiner—M. Henson Wood, Jr.
Assistant Examiner—Thomas C. Culp, Jr.
Attorney—Sellers and Brace

[54] AUTOMATIC LATHER GENERATOR AND DISPENSER 24 Claims, 5 Drawing Figs.

[52] U.S. Cl. **239/316,**
239/417.3, 239/432, 239/553.3
[51] Int. Cl. **B05b 7/26**
[50] Field of Search 239/310,
316, 417.3, 432, 590.3, 553.3; 222/190, 193, 195,
189, 320, 207; 169/15, 14

[56] **References Cited**
UNITED STATES PATENTS
3,186,490 6/1965 Jamison et al. 169/14 X
3,342,271 9/1967 Anthony, Jr. 169/15

ABSTRACT: An automatic lather generator and dispenser for objects undergoing laundering, as motor vehicles, and including means for preparing and maintaining a nonpressurized supply of concentrated aqueous detergent solution. The solution is pressurized and intimately mixed with pressurized air before release and expansion as a thick stable lather into a closed storage chamber. The storage chamber is maintained full of fresh lather so that the formation of fresh lather displaces other lather through flow restrictor means onto the object undergoing laundering. Lather generation and dispensing is initiated automatically as the object advances and actuates control means governing the supply of pressurized air and detergent solution and terminates as the object passes.



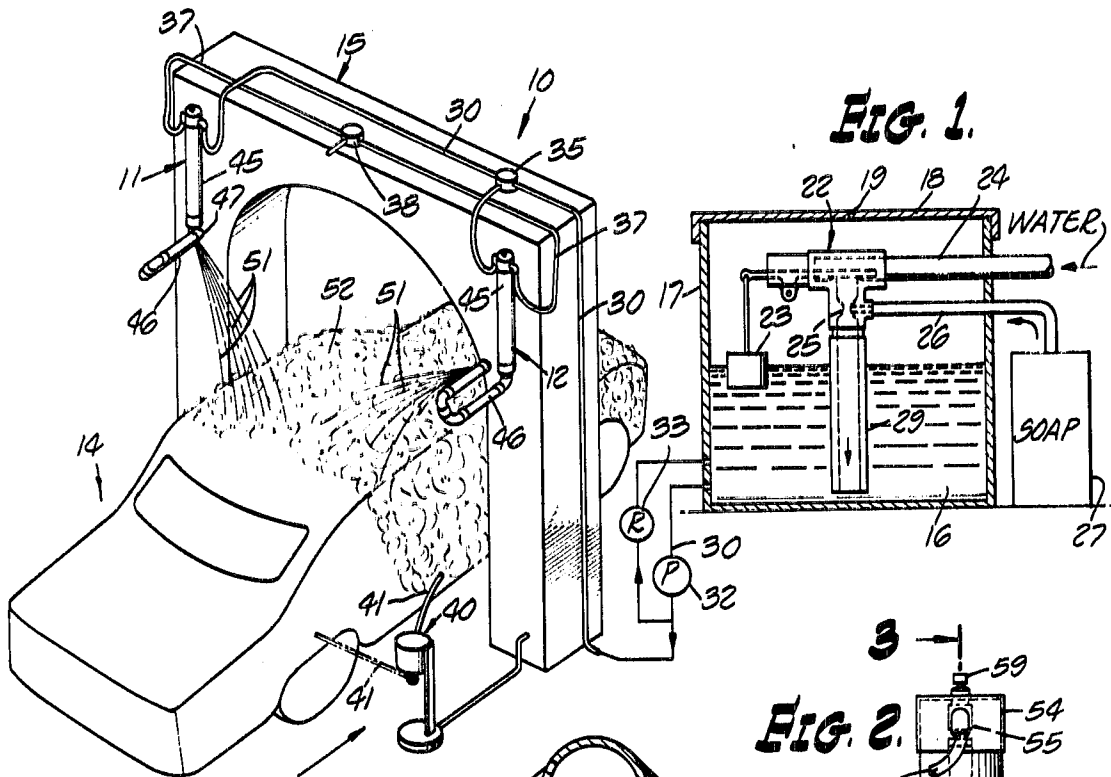


Fig. 1.

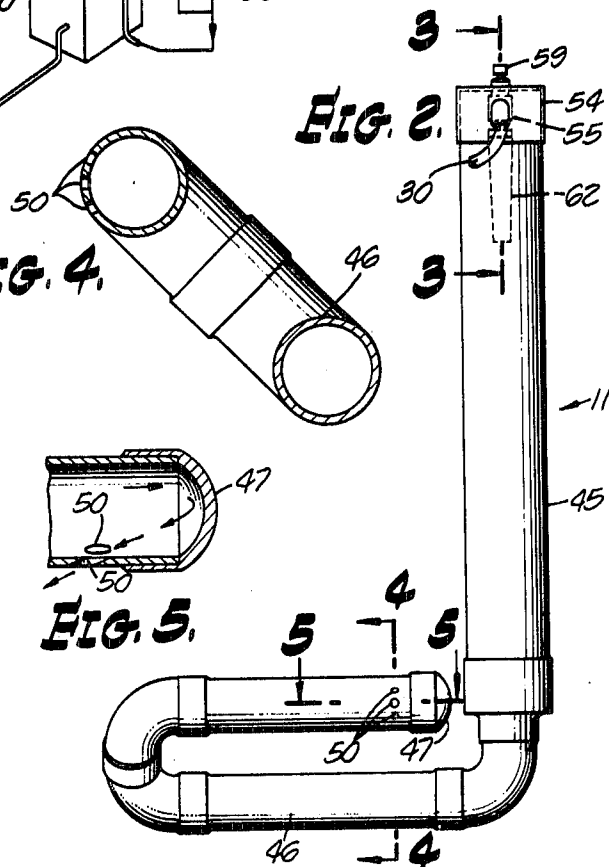


Fig. 2.

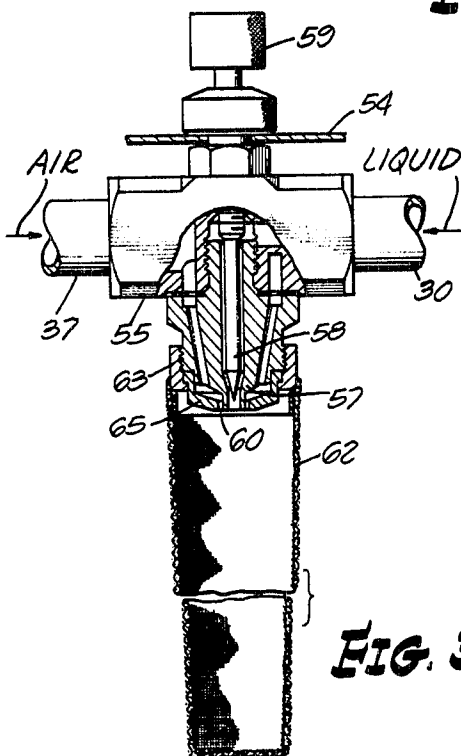


Fig. 3.

Fig. 4.

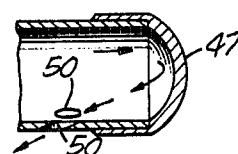


Fig. 5.

INVENTOR
NICK CONTI

BY  
ATTORNEYS

AUTOMATIC LATHER GENERATOR AND DISPENSER

This invention relates to lather generating apparatus, and more particularly to an improved automatic generator and dispenser responsive to the approach of the object to be laundered to generate and dispense lather over its surface and to discontinue lather dispensing as the object exits.

The advent of automated laundering equipment, particularly that employed to launder vehicles of all kinds, has emphasized the need for suitable and reliable means for generating and dispensing lather copiously and efficiently over the surface to be cleaned. Various proposals have been made and placed in use in attempts to meet this need but up to this time these various proposals have been found unsatisfactory, unreliable, erratic, and subject to frequent servicing. This is not surprising in view of the widely differing conditions and requirements encountered in actual practice. Vehicle laundering is customarily carried on in open areas exposed to the elements and subject to widely varying temperature and humidity conditions. Even when the laundry facility is operating at capacity, there is an interval between adjacent vehicles during which it is desirable to interrupt the lather supply in the interest of economy. Under less favorable conditions there may be long gaps between vehicles as well as interruptions of varying duration in the operation of the equipment.

These latter conditions in particular pose problems as respects the lather supply equipment for reasons self-evident to those experienced in operating equipment handling detergent solutions. These solutions tend to solidify on surfaces, ports, valves and to form adhering films between relatively moving parts and otherwise modify or cause malfunctioning of the equipment, particularly when not maintained in steady operation. The trouble can occur anywhere in the system and its location and correction can be time consuming and costly. The malfunctioning lathering equipment can necessitate deactivating the entire laundry facility thereby temporarily trapping numerous vehicles in a partially laundered condition.

The present invention avoids the foregoing and many other shortcomings of prior lather producing and dispensing devices utilizing simple, highly reliable components equally effective to supply lather in profuse quantities either continuously or on a highly irregular, intermittent basis. Float-controlled proportioning means connected to a source of pressurized water and a bulk quantity of liquid detergent operates to mix and maintain a predetermined quantity of concentrated detergent solution. A continuously operating pump maintains a small quantity of this solution under pressure in instant readiness for delivery to the lather generator immediately that a solenoid-operated valve is energized. A switch provided with a sensing wand extending into the path of a vehicle or other object to be lathered supplies this detergent solution along with pressurized air to the lather generator. The detergent solution is nebulized and intimately mixed with the air and allowed to expand through fine mesh into a lather storage chamber closed except for lather discharge ports. By properly limiting the quantity of water admixed with the detergent and by isolating the lather from contact with the atmosphere, the lather generating components are maintained in a moist and stable atmosphere and a reserve supply of lather is likewise protected against drying and collapse and in instant readiness for dispersal onto a vehicle or other object. No valves are required to control the flow of lather other than the dispensing ports, the surface tension and coherence properties of the lather which cooperate to retain the lather captive until resumption of lather generation causes streams of the lather to be ejected in a fanlike array several feet in width.

Accordingly it is a primary object of the present invention to provide a unique method and apparatus for generating and dispensing lather.

Another object of the invention is the provision of means responsive to the approach of an object to be laundered to a soaping station to activate lather generating and dispensing apparatus operable to cover the object with a layer of lather and for interrupting the operation as the object exits.

Another object of the invention is the provision of fully automatic means for continuously forming a concentrated detergent solution and for admixing this solution under pressure with pressurized air to form thick foaming lather free of liquid.

Another object of the invention is the provision of means for generating thick stable lather and delivering the same into a storage chamber out of contact with the atmosphere until needed.

Another object of the invention is the provision of an improved method for generating thick water-free lather by expanding pressurized air and nebulized pressurized detergent solution through fine foraminous material into a lather storage chamber in communication with the atmosphere only through continuously open dispensing port means.

Another object of the invention is the provision of an improved fully automatic lather-generating and dispensing means for use in an automatic vehicle laundry facility and response to the approach of a vehicle to the lather generator to generate and disperse a thick layer of foam over the vehicle and to discontinue the supply of lather until the next vehicle approaches the station.

These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawing to which they relate.

Referring now to the drawing in which a preferred embodiment of the invention is illustrated:

FIG. 1 is a generally schematic view partially in perspective and partially in cross section showing a preferred embodiment of the invention in operation to dispense lather onto a vehicle in the process of being laundered;

FIG. 2 is a fragmentary elevational view on an enlarged scale of the lather generator per se;

FIG. 3 is a cross-sectional view partly in elevation and taken generally along line 3—3 on FIG. 2;

FIG. 4 is a cross-sectional view on an enlarged scale taken along line 4—4 on FIG. 2; and

FIG. 5 is a cross-sectional view on an enlarged scale taken along line 5—5 on FIG. 2.

Referring initially more particularly to FIG. 1, there is shown one illustrative embodiment of the invention, designated generally 10, forming part of an automated vehicle-laundering facility of any suitable construction and utilizing power means, not shown, for advancing successive vehicles past a series of laundering stations. The lather generators proper 11, 12 are suitably supported along the opposite sides of a main frame 15 straddling the path of vehicles 14 advancing therpast.

Lather generators 11, 12 are supplied with a concentrated detergent solution 16 stored in a tank 17 of suitable noncorrosive material, such as stainless steel, normally closed by a cover 18 provided with an atmospheric vent 19.

Solution 16 is maintained at a desired level in tank 17 by a suitable proportioning device 22 equipped with a water supply valve controlled by a float 23 effective to cut off the flow of water from a water supply pipe 24 whenever the level in tank 17 rises to a chosen point. Proportioning device 22 includes a venturi passage 25 having its throat connected with a port in communication with a pipe 26 extending into a bulk container 27 of liquid detergent. Thus, when the level of detergent solution 16 falls sufficiently to open the water valve pressurized water passing through the throat of venturi 25 entrains a proportional flow of detergent from bulk container 27 and discharges these intermixed liquids downwardly through conduit 29 and into tank 17.

Solution 16 is conveyed from tank 17 to each of the lather generators 11, 12 through a conduit 30 and is raised to a suitable pressure, as 30–40 p.s.i., by pump 32. Desirably, pump 32 operates continuously to maintain the solution under a selected pressure on the discharge side of the pump, the pressure being determined by the setting of a regulatable pressure-relief valve 33. However, this pressurized solution is admitted into the lather generator only if a separate solenoid valve 35 for each generator is energized and open.

Pressurized air maintained at a pressure of approximately 20 p.s.i. by a suitable pressure regulator, not shown, is supplied to each lather generator provided an associated solenoid valve 38 is open. As herein shown the solenoid valves are under the control of a normally open vehicle-sensing switch 40 having a sensing wand 41 extending into the path of the object to be lathered as it approaches the laundering station.

It will be understood that wand 41 is positioned in the path of an approaching car and is deflected thereby to close and maintain switch 40 closed while passing through the lathering station. As is apparent from FIG. 1, the wand opens the switch in time to terminate dispensing of lather as the rear end reaches the plane of the streams of lather as will be described more fully presently.

The structural details of the lather generators 11, 12 are best shown in FIGS. 2 to 5. Each is constructed of suitable material immune to attack by detergent, such as plastic, copper, stainless steel or the like. As herein shown, the generators have a main body 45 formed of tubular members and pipe fittings preferably assembled to provide an upright lather storage chamber and a generally horizontal flow restrictor chamber 46. The latter chamber is here shown as being generally U-shaped but it will be understood that the flow restrictor may be of various other shapes. The storage chamber approximately 2 feet long and 3 inches in diameter has been found to provide excellent results and to store an ample reserve supply of lather. The end of flow restrictor 46 is preferably capped with a dome-shaped fitting 47 and the adjacent sidewall of the conduit is provided with at least one, and preferably three or four, lather discharge ports 50. These unrestricted ports are sized to discharge a thick stream of lather, a diameter of three-sixteenths to five-sixteenths of an inch providing excellent results. It has also been found that superior results are obtained if the axes of the openings are inclined to the axis of tubing 46 in the manner best shown in FIG. 5. Ports 50 are effective to deliver several streams 51 of lather dispersed in a fanlike array ample to form a thick covering layer 52 extending over all outer surfaces of the vehicle.

Mounted in the upper end 54 of the generator is a mixing and atomizing valve 55 having oppositely extending inlets respectively connected to the detergent solution supply hose 30 and to the air supply hose 37. The detergent discharges through an atomizing nozzle 57 controlled by an adjustable needle valve 58 having a control knob 59 readily adjustable by the operator. Air entering from conduit 37 issues in an annular stream from port 60 and intercepts or mingles with the finely divided detergent solution issuing from the port of nozzle 57. This mixture of detergent and air then expands through one or more sleeves of fine wire mesh or the like foraminous material 62 surrounding the outlet ports of valve 55 and into the lather storage chamber provided by housing 45. The wire mesh 62 is preferably bonded to a ring 63 holding the air nozzle ring 65 assembled to nozzle 57.

The operation of the lather generator will be quite apparent from the foregoing detailed description of its components and controls. When the apparatus is not in use a water supply valve for supply pipe 24 is closed. Accordingly, the apparatus is placed in use by opening this valve and turning on the power supply for pump 32. A master switch controlling the power supply to the wand-controlled switch 40 is also closed and a main control valve for the pressurized air supply is opened.

The operator then checks to determine whether there is a supply of lather present in the storage chambers of the generators by manually operating wand 41 to close switch 40. This opens the solenoid valves 35, 38 supplying detergent solution and air to the mixing valve 55. Lather is immediately formed and, if a supply is then present, lather will immediately begin to issue from dispensing ports 50. If lather does not issue, switch 40 is held closed until it does discharge thereby indicating that a full charge of lather is present. As soon as a car approaches the lathering station and activates wand 41, solenoids 35, 38 in circuit therewith are activated and the generation of additional lather is immediately effective to dispense

stored lather from ports 50 and to jet the same in several streams each directed to a different area of the car. Since the car has preferably been wetted by water from a previous laundry station, the streams of lather quickly merge to form a continuous layer 52 of thick lather. When the car advances past wand 41 the latter resumes its normally extended position to deenergize each of solenoids 35, 38 thereby discontinuing the generation and dispensing of lather through ports 50 despite the lack of a valve of any kind for these ports.

As soon as the detergent level falls sufficiently to lower float 23 and open the water supply valve, water enters the proportioning device 22 and entrains a predetermined proportional amount of liquid detergent and thoroughly intermixes these liquids as they pass downwardly through discharge tube 29 into tank 17.

While the particular automatic lather generator and dispenser herein shown and disclosed in detail is fully capable of attaining the objects and providing the advantages hereinbefore stated, it is to be understood that it is merely illustrative of the presently preferred embodiment of the invention, and that no limitations are intended to the details of construction or design herein shown other than as defined in the appended claims.

I claim:

1. A substantially closed lather generator for use in automatic vehicle-laundering equipment comprising an elongated lather expansion and storage chamber closed except for lather-dispensing port means adjacent one end thereof, unitary means remote from said lather-dispensing means with non-moving parts for simultaneously jetting air and liquid detergent lathering solution in finely divided form against foraminous material and into the adjacent area of said lather expansion chamber, and separate means for supplying compressed air at several p.s.i. and pressurized lathering solution to said unitary jetting means to generate a stable lather and for maintaining sufficient air pressure at the closed end of said chamber to dispense lather from said dispensing port means.

2. A lather generator as defined in claim 1 characterized in that said lather expansion and storage chamber is in continuous communication with the atmosphere by way of said lather-dispensing port means.

3. A lather generator as defined in claim 1 characterized in that said foraminous material comprises multiple layers of fine mesh screen through which said pressurized liquid lathering solution and air passes into said lather expansion and storage chamber.

4. A lather generator as defined in claim 3 characterized in that said lather expansion and storage chamber is tubular and opens at one end into a tubular substantially closed flow restrictor chamber of substantially smaller diameter having at least one valveless lather-dispensing port in the sidewall thereof.

5. A lather generator as defined in claim 4 characterized in that said unitary jetting means and said foraminous material are mounted centrally of the closed end of said tubular lather storage chamber and remote from the entrance into said flow restrictor chamber.

6. A lather generator as defined in claim 4 characterized in that said expansion chamber extends generally vertically and said tubular flow restrictor chamber extends generally horizontally from the lather outlet end of said expansion chamber.

7. A lather generator as defined in claim 1 characterized in that said lather-dispensing port means comprises an elongated flow restrictor chamber having an internal cross-sectional area which is relatively small compared to the cross-sectional area of said lather expansion and storage means, and at least one lather-dispensing port having a cross-sectional area a small fraction of the cross-sectional area of said flow restrictor.

8. A lather generator as defined in claim 7 characterized in that said lather-generating and storage chamber comprises a relatively large diameter upright tube opening near the lower end thereof into a generally horizontally disposed tubular flow

restrictor chamber of substantially smaller cross-sectional area and provided with lather-dispensing port means at a level above the interior bottom surface thereof to trap liquid-lathering solution until the same expands into a lather.

9. A lather generator as defined in claim 8 characterized in the provision of a plurality of valveless normally open lather-dispensing openings disposed and sized to dispense an array of lather slugs therefrom.

10. A lather generator as defined in claim 1 characterized in that unitary air- and liquid-jetting means comprises a main housing having an adjustable normally open needle valve controlling a lather solution outlet port opening axially into said lather expansion chamber, and said main housing having a valveless air outlet means for jetting compressed air into the jet of lathering solution issuing past said needle valve.

11. A lather generator as defined in claim 10 characterized in that said needle valve includes control means manipulatable from the exterior of said expansion chamber to vary the size of the flow passage for said lathering solution.

12. A lather generator as defined in claim 10 characterized in that said air outlet means comprises a radially narrow annular port closely concentric to the jet of lathering solution issuing past said needle valve.

13. A lather generator as defined in claim 10 characterized in that said air- and liquid-jetting means is mounted on the interior side of an end cap sealed to one end of said expansion chamber.

14. A lather generator as defined in claim 10 characterized in that said foraminous material is detachably mounted over the discharge end of said air- and liquid-jetting means in the path of the air and lathering solution jets.

15. A lather generator as defined in claim 1, characterized in the provision of control means for simultaneously initiating and discontinuing the jetting of air and lathering solution into said expansion chamber whereby said expansion and storage chamber remains full of lather at the end of a lather-generating cycle.

16. A foam generator as defined in claim 15, characterized in the provision of means normally biasing said control means to the closed position thereof, and actuator means for holding said control means in the open position thereof.

17. A lather generator as defined in claim 16 characterized in that said actuator means for said control means is positioned sufficiently close to said lather-dispensing port means that the movement of an object into position to receive dispensed lather is positioned to hold said actuator means in the open position for said control means.

18. A lather generator as defined in claim 17 characterized in that said actuator means includes off-on switch means normally biased to one position thereof and having means extending into the path of a vehicle moving past said lather-dispensing port means and operable by contact with the vehicle to hold said switch means in the other of said off-on positions so long as the vehicle is in actuating contact therewith.

19. A lather generator as defined in claim 1 characterized in that said means for supplying lathering solution to said unitary jetting means includes: means storing a supply of liquid detergent, tank means for storing a limited intermixed supply of water and liquid detergent, pump means for withdrawing said intermixed water and detergent from said tank means and introducing the same into said unitary jetting means under pressure, and means responsive to the withdrawal of intermixed water and liquid detergent from said tank means to replenish into said tank means proportionate quantities of water from a supply thereof and liquid detergent from said stored supply.

20. A lather generator as defined in claim 1 characterized in that said means for supplying lathering solution to said unitary jetting means comprises: means for utilizing a pressurized source of water to entrain a predetermined proportionate quantity of liquid detergent into a storage chamber for lathering solution and operable to replenish said lathering solution in response to the withdrawal of lathering solution from said storage chamber, and pump means for introducing lathering solution from said storage chamber into said unitary jetting means under pressure.

21. A lather generator as defined in claim 20 characterized in that said pump means comprises a nonpositive-displacement pump operating continuously and irrespective of the demand for lathering solution and including pressure-relief valve means operable to return lathering solution to said storage chamber until there is a demand for lathering solution at said lather expansion and storage chamber.

22. A lather generator as defined in claim 21 characterized in the provision of normally closed control valve means for each of said separate means for supplying pressurized air and lathering solution to said unitary jetting means, and means for opening and closing each of said control valve means.

23. A lather generator as defined in claim 21 characterized in that said means for opening and closing each of said control valves operates both control valves substantially in unison.

24. A lather generator as defined in claim 19 characterized in that each of said means for storing liquid detergent and lathering solution is under atmospheric pressure.

50

55

60

65

70

75