Nov. 2, 1965 J. M. LEVY 3,215,642

LATHER MAKING MACHINE

Filed May 6, 1963 2 Sheets-Sheet 1

Fig. 1

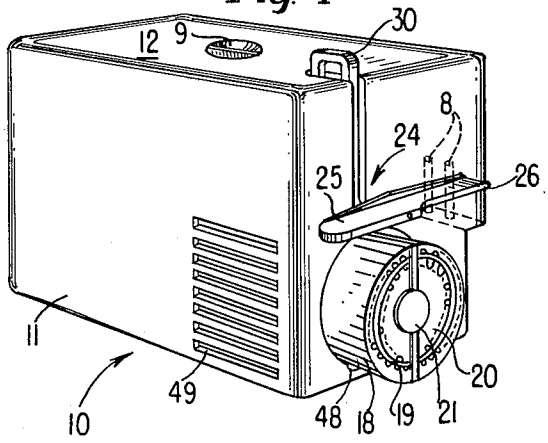


Fig. 2

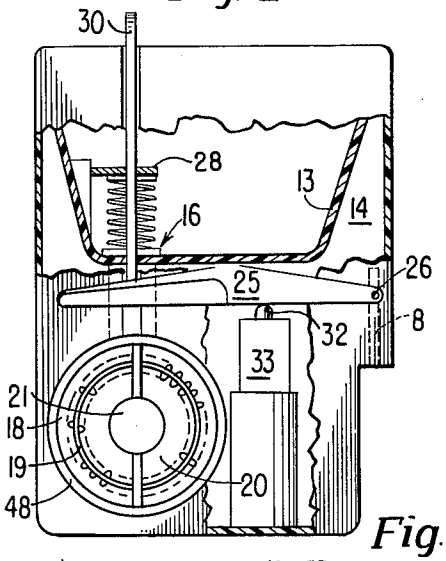


Fig. 5

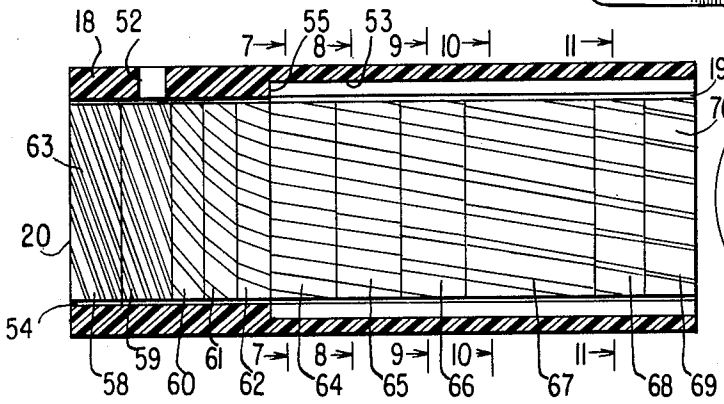


Fig. 6

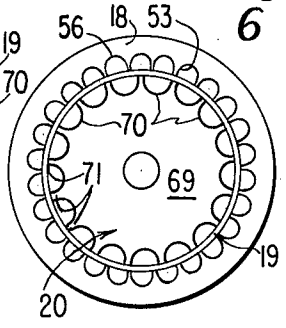


Fig. 7

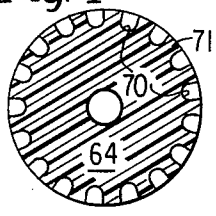


Fig. 8

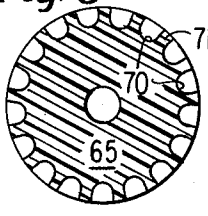


Fig. 9

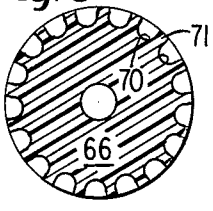


Fig. 10

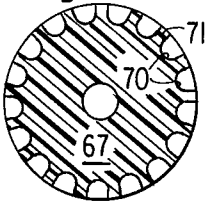
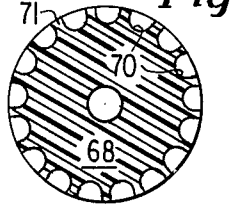


Fig. 11



INVENTOR.
Jacob M. Levy

BY

Bair, Freeman & Molinare.
ATTYS.

Nov. 2, 1965 J. M. LEVY 3,215,642

LATHER MAKING MACHINE

Filed May 6, 1963 2 Sheets-Sheet 2

Fig. 3

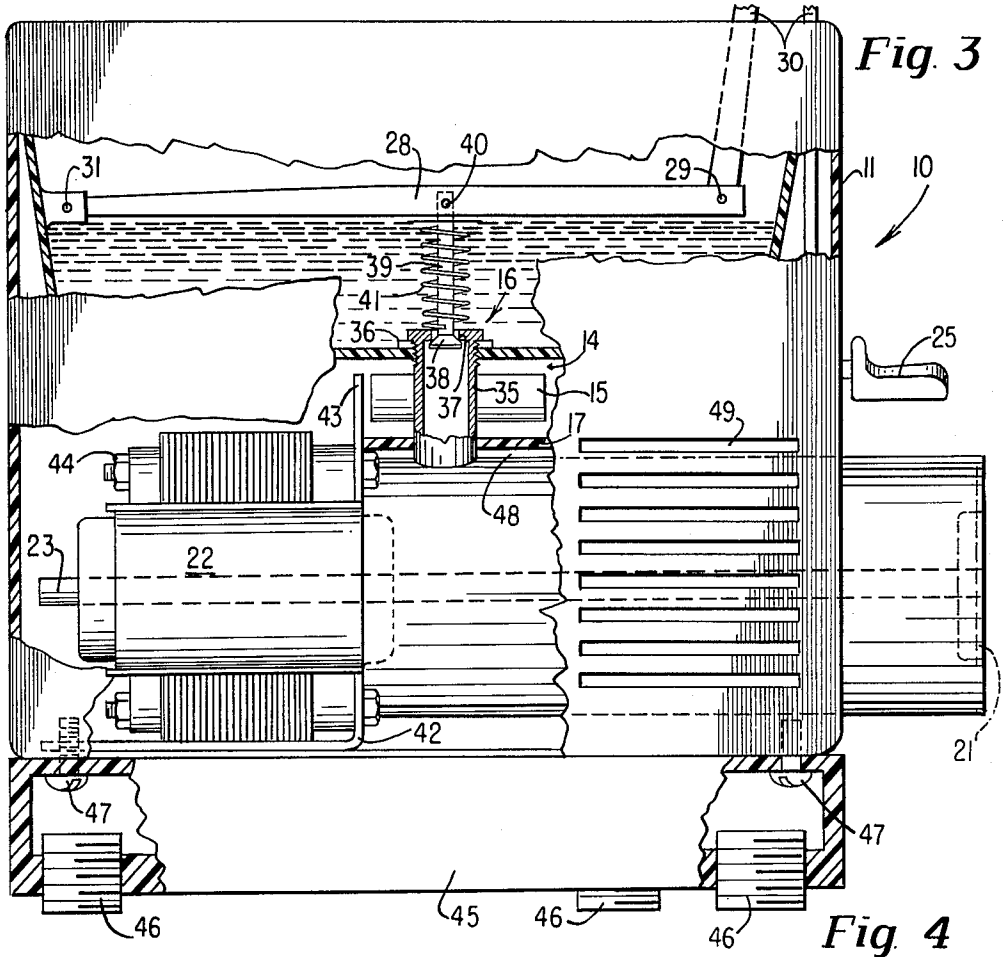


Fig. 4

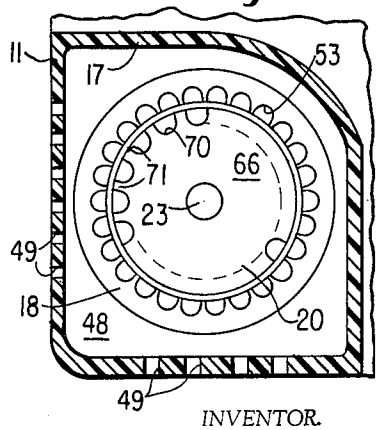
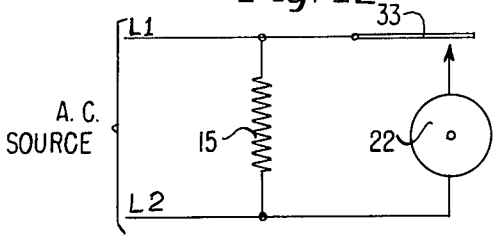


Fig. 12



INVENTOR.
Jacob M. Levy

BY

Bair, Freeman & Molinare.
ATTYS.

United States Patent Office 3,215,642 Patented Nov. 2, 1965

3,215,642

LATHER MAKING MACHINE

Jacob M. Levy, 6697 Northwest Highway, Chicago 31, Ill.

Filed May 6, 1963, Ser. No. 278,226
11 Claims. (Cl. 252—359)

This invention relates to a novel lather making machine and, more particularly, to improved tonsorial apparatus for producing shaving lather from liquid soap.

Lather making apparatus has heretofore been proposed for feeding liquid soap to a rapidly rotating rotor or screw and for heating the housing about the screw to convert the liquid soap into lather. Such prior devices commonly used a universal motor to drive the rotor. As the motor itself was relatively expensive and might represent three-fourths of the total cost of such lather making machine, the cost of the lather making machine was high.

Another disadvantage of prior machines was that the initial lather produced by such machines which have been idle for several hours was often too thin and watery due to the fact that the liquid soap was not whipped long enough before being extruded from the whipping compartment. This thin, watery lather was unsuited for shaving and had to be discarded, thus creating a nuisance effect. Further, in prior constructions wherein the whipping chamber was heated within the heating area proper, or where the whipping chamber and heating area were separated by a common wall, large air bubbles were created in the lather, thus making a lather that was too light in density.

The inefficiency of prior constructions was in part due to the construction and design of the screw-like whipping instrument which was often too small and did not provide adequate whipping or beating of the liquid soap to create a proper lather low in alkali-content, high in water content, yet having rich and creamy consistency.

An object of the present invention is to provide a novel lather making apparatus suitable for use both in the barber shop and in the home in which the disadvantages and deficiencies of prior apparatus are overcome.

Another object of the present invention is to provide a novel highly efficient lather making machine of relatively inexpensive construction which utilizes a low-cost shaded-pole motor.

A further object of this invention is to provide a low-cost lather making machine having novel whipping means comprising a rotor rotatable within a cylinder, the rotor being driven by a shaded-pole motor.

Another object of the present invention is to provide a lather making machine having a novel multiple-angled helically toothed rotor member therein for effectively whipping the liquid soap to provide a rich, creamy shaving lather which is low in alkali content and high in water content.

Yet another object of the present invention is to provide a lather making machine having unique whipping means comprising a rotor having tapered grooves in the surface thereof disposed within an internally grooved housing member, the housing member being spaced from the heated chamber within the lather making machine.

It is a further object of the present invention to provide a liquid soap lather making machine, wherein the components are organized so that the receptacle containing the liquid soap is adequately heated to keep the soap in suspension and the cylindrical member within the rotatable whipping instrument is disposed is substantially insulated from the heat in order that the temperature thereof be about 15 to 20 degrees less than the temperature of the liquid soap, so as to provide for a better and richer lather.

The above and other objects and features of this invention will be more readily apparent from the following description when read in connection with the accompanying drawing, in which:

FIGURE 1 is a perspective view of the lather making machine embodying the present invention;

FIGURE 2 is an end view, partially in section, of the lather making machine of the present invention;

FIGURE 3 is a side view of the lather making apparatus of the present invention, with parts broken away, and illustrating an adjustable base for supporting the lather making apparatus;

FIGURE 4 is a detail sectional view of the lather making machine illustrating the orientation of the whipping means within the housing of the lather making machine;

FIGURE 5 is an enlarged view of the whipping means, illustrating the cylinder thereof in section;

FIGURE 6 is an end view of the whipping means of FIGURE 5;

FIGURE 7 is a cross-sectional view of the rotor of the whipping means taken along line 7—7 of FIGURE 5;

FIGURE 8 is a cross-sectional view taken along line 8—8 of FIGURE 5;

FIGURE 9 is a cross-sectional view of the rotor taken along line 9—9 of FIGURE 5;

FIGURE 10 is a cross-sectional view of the rotor taken along line 10—10 of FIGURE 5;

FIGURE 11 is a cross-sectional view of the rotor taken along line 11—11 of FIGURE 5; and

FIGURE 12 is an electrical circuit diagram for the lather making machine.

Referring now to FIGURES 1, 2 and 3, the presently preferred embodiment of the present invention comprises a lather making machine **10** having an open-topped unitary housing or casing **11**, preferably molded from plastic. Openings **8** may be provided in a side wall of the housing for receiving studs or pins on a wall bracket so as to support the housing **11** on a wall. Provided within the housing **11** and extending substantially the length and width thereof is a receptacle means **13** for liquid soap. The receptacle means **13** is covered by a removable cover **12** having suitable handle means **9** thereon for gripping the same.

Provided in housing **11** adjacent to and beneath the receptacle means **13** is a chamber **14**. Within chamber **14** is a heater **15** for warming the liquid soap contained in the receptacle **13** so as to keep the soap particles in solution and provide a homogeneous soap mixture. It is preferable that the liquid soap be heated to a temperature in the range of 40 to 45° C.

Communicating with the bottom of the receptacle **13** and extending downwardly therefrom is a valved conduit means **16**, which connects at its bottom with a liquid soap inlet opening in the top of a horizontally elongated cylindrical member **18**. The rear of member **18** is spaced from and thus substantially insulated from the wall **17** of the housing **11** defining a portion of chamber **14**. The front end of member **18** extends outwardly from an end of housing **11**. Disposed within the elongated cylindrical member **18**, which preferably is open at each end, is a cylindrical whipping instrument or rotor **20** which cooperates with the cylindrical member **18** to whip the liquid soap and extrude a rich, creamy lather suitable for shaving from discharge opening **19**. The novel cooperation between the member **18** and the rotor **20** will be more fully explained later. The outer end of rotor **20** is journalled by a bearing **21** secured to the housing member **18**.

The cylindrical rotor **20** is operatively connected to shaft **23** of the shaded-pole electric motor **22**. It is an important feature of the present invention that use be

made of a relatively inexpensive shaded-pole electric motor in place of the more expensive universal-type motor which is presently being used in other lather making machines. The whipping means of the present invention is particularly designed for use with a shaded-pole motor. The shaded-pole motor rotates at about 3,300 r.p.m. unloaded, whereas the universal motor rotates at 6,000 to 15,000 r.p.m. Preferably, I utilize a 2-pole, 1/27 horsepower shaded-pole motor.

Control means **24** are provided for actuating the valve within the valved conduit means **16**. Such means comprise a handle **25** pivotally mounted on pivot pin **26** affixed to an end of the housing **11**. The linkage for actuating the valve within the valved conduit means **16** includes a link arm **30** pivotally secured at **29** to a link arm **28**. Arm **28** is pivotally connected at **31** to the housing **11**. When the handle **25** is pivoted about pivot pin **26**, the link arms **28** and **30** will be moved downwardly to open the valve within the conduit means **16** and thus permit the flow of liquid soap from within the receptacle **13** into the cylindrical member **18**.

Referring to FIGURE 2, it is seen that the handle **25**, which actuates the valve within valved conduit means **16**, also actuates the actuating member **32** of electrical switch **33**. The electrical switch **33** is in the electrical circuit to the motor **22**. When the switch **33** is energized, the motor will rotate and drive the rotor **20** within the member **18**. Thus, it is apparent that when the handle **25** is depressed, the valve within the valved conduit means **16** opens and at the same time, the motor **22** is energized to begin the lather making operation.

In FIGURE 3, there is illustrated a side view of the lather making machine **10** of the present invention, with parts broken away to more clearly show the valved conduit means **16** and with an adjustable base being illustrated at the bottom of the housing **11**. The valved conduit means **16** includes a conduit **35** which extends from the bottom of the receptacle **13** to the top of the cylindrical member **18**. The flanged top of the conduit **35** engages a washer **36** provided between the flanged top and the bottom of the receptacle for sealing the same and preventing liquid soap from entering the chamber **14** defined within the housing **11** beneath the receptacle **13**. The flanged top of the conduit **35** defines a valve seat **37** which is adapted to be engaged by valve **38** affixed to the valve stem **39**. The valve stem **39** is pinned to arm **28** as indicated at **40** and is biased to the closed position by the coil spring **41** disposed between the top of the conduit **35** and the bottom of the link arm **28**.

The motor **22** is affixed to the motor mounting bracket **42** by suitable fastening means **44** and bracket **42** is in turn adapted to be connected to the base of the housing **11**. The motor mounting bracket includes a vertically disposed wall **43** to which the rear of cylindrical member **18** is secured. Thus, the cylindrical member **18** is secured at an end to bracket **42** and is connected intermediate its end by conduit **35** which is threadedly connected with the liquid soap receptacle **13**.

The housing **11** of the lather making machine **10** of the present invention may be adjustably supported on a table or shelf by means of an adjustable base **45** having a plurality of legs **46** adjustably secured with respect to the base. Suitable fastening means, as for example, screws **47** are provided to connect the base to the bottom of the housing **11**. It is noted that the rear screws **47** extend into the horizontally disposed portion of the motor mounting bracket **42** and thus affix the rear of the bracket **42** in place within the housing **11**.

As is clearly seen in FIGURES 1–4, the exterior of cylindrical member **18** is spaced from the walls of housing **11** and an annular space **48** is defined therebetween. In this manner the heat from within chamber **14**, which is necessary to maintain the soap particles in solution and thus provide a homogeneous soap mixture, is effectively insulated from cylinder **18**. It is desired that the temperature of the cylindrical member **18** be about 15 to 20 degrees less than the temperature of the liquid soap in receptacle **13**. In this manner overheating of member **18** and the subsequent deleterious effects on the quality of the lather produced is prevented. To further control the temperature about the cylinder, vent openings **49** may be provided in housing **11** additionally communicating annular space **48** with the atmosphere. The radiant heat reaching member **18** will be adequate to warm the member for proper operation of the whipping means.

In FIGURES 4–11 the novel whipping means of the present invention are more clearly illustrated. The whipping means comprise the housing member **18** made from plastic and being generally cylindrical in shape and the rotor or whipping instrument **20**.

The member **18** which is suitably affixed at its rear end to bracket **42** has a plurality of axially extending grooves **53** defined in the inner cylindrical surface thereof. Though the exterior of the member **18** is shown as being cylindrical, it will be apparent that other shapes may be used. The interior surface **54** of the housing **18** extending from the rear thereof to the end of the grooves indicated generally at **55** is smooth.

It has been ascertained that best results are obtained when the grooves **53** have a rounded or generally semi-cylindrical bottom **56** and are about 1/8 inch deep. The grooves are somewhat wider than they are deep. Preferably, member **18** is formed with 26 grooves therein and each groove is 1/8 inch deep and 5/32 inch wide.

A rotor one and one-half inches in diameter and having an overall length of about five inches has been advantageously used with a shaded-pole drive motor.

The rotor **20** comprises a conveying section, generally coextensive with surface **54** in housing member **18** and a whipping section, generally coextensive with grooves **53**. The conveying section of rotor **20** consists of a plurality of threaded or toothed gear portions, with the portions **58** and **59** defining a first part having a relatively steep helix angle and the portions **60**, **61**, and **62** defining a second part having consecutively lesser helix angles from rear to front. It will be understood that rotor **20** may be integrally formed or may be formed from two or more sections suitably machined or molded. In one presently preferred embodiment of the invention, sections **58** and **59** have helix angles of 70 degrees and the angles of sections **60**, **61** and **62** are 50, 40 and 20 degrees, respectively.

The liquid soap flowing through opening **52** will fall upon gear portion **59** and be sprayed or carried to the right as viewed in FIGURE 5. The soap is conveyed in the pure liquid state to gear **60** which is the beginning of the second part of the conveying section. No whipping occurs at gears **58** and **59** because of the steep helix angle of these gear sections.

In the second part of the conveying section, as gears **60**, **61**, and **62**, a light beating of the liquid soap commences and bubbles or light foam is formed. The soap reaching the beginning of grooves **53** is in a foamed or bubbly condition and thus is effectively received by the whipping section of rotor **20**.

Thus, the functions performed by the conveying section of rotor **20** are (1) movement of the liquid soap from inlet **52** to gear **60**, (2) preliminary mild beating of the liquid soap at gears **60**, **61**, and **62** to prepare it for effective working and beating in the whipping section, (3) conveying the soap in the form of light foam to the whipping or beating section of rotor **20**, and (4) the prevention of the back-up of thick lather toward the rear end of housing member **18**, hence obviating the stoppage of flow of liquid soap through inlet **52** into housing member **18** and permitting continuous operation of the lather producing machine, where desired.

The whipping section of rotor **20** may be comprised of a plurality of gear sections **64–69**. Defined in the periphery of the gear sections in the whipping section of rotor **20** are a plurality of groove means which taper or widen toward the discharge end of rotor **20**. The grooves **70** in

each gear section are in alignment with one another and cooperate to define a plurality of helical grooves in the exterior surface of rotor **20**.

Liquid soap, which may be formulated for producing shampoo lather for washing the hair or lather suitable for shaving, is conveyed from the inlet **52** to gear section **64** by the gear members in the conveying section of rotor **20**. At gear sections **64**, the beating of the semi-liquid or foamed soap into a lather begins. Paddles or teeth for beating and whipping the semi-liquid soap into a lather are formed by the ridges **71** between adjacent grooves **70** in rotor **20**. The lather is less dense than the semi-liquid soap and requires more space for proper expansion of the volume thereof for proper whipping. Accordingly, the grooves **70** are widened toward the discharge end of rotor **20**, as is clearly seen in FIGURES 5–11. The tapering of grooves **70** increases the efficiency of the lather making process and facilitates the extrusion of the lather from the whipping means.

The helix angle of grooves **70** of rotor **20** was found to be of critical importance. The most effective helix angle was determined to be 10 degrees. This angle is critical for if it is too small the extrusion process is adversely effected and lather will tend to back up into the conveying section between housing **18** and rotor **20**. On the other hand if the helix angle were too large, the resultant lather would be of poor, thin consistency and would be extruded more slowly than is desired.

Sufficient clearance must be provided between the rotor **20** and the cylindrical member **18** to permit a proper beating and discharge of lather from the discharge opening **19**. A radial clearance of 0.030 inch has proven very successful. To assure maintenance of the desired clearance, the end of the rotor **20** is journaled in bearing **21** and the bearing is secured to the end face of the cylindrical member **18**.

The components of the novel whipping means cooperate to provide a rich, creamy lather at high speed with quick extrusion from the discharge end of member **18**. The lather is low in alkali content for with the present invention improved whipping of the liquid soap is effected and the mixture of liquid soap may have a higher water to soap ratio than is ordinarily considered desirable.

Turning now to FIGURE 12, there is illustrated a schematic wiring diagram of electrical circuit of my lather making machine. It will be noted that the heater **15** is provided across the line so that whenever the leads L_1 and L_2 are connected to a suitable source of power, as for example, a 115 volt, 15 ampere source of alternating current, the heater will be energized to heat the liquid soap confined within the receptacle **13**. Provided in series with the motor **22** is the switch **33**. Thus, it will be seen that the motor **22** will be actuated whenever the switch **33** is closed.

Operation

Briefly to summarize the operation of my device, the cover **12** is removed from housing **11** to fill receptacle **13** with liquid soap. By means of a conventional electric wall plug, the lather making machine **10** may be connected to a source of electrical power. The heater **15** is connected electrically across the line and will be energized to heat the liquid soap within the receptacle **13**. Typically, a 10-watt heater may be utilized.

When one desires to shave, he need merely press the handle **25**, simultaneously actuating the motor **22** and opening the valve **38** within the valved conduit means **16**. The liquid soap will pass from receptacle **13** into cylindrical housing member **18** and will be conveyed from the helically-grooved portion **59** to grooved or gear portions **60, 61** and **62**. Preliminary mild beating of the liquid soap occurs in sections **60, 61** and **62** and the liquid soap is subdivided and mixed with air to form a light foam. This light foaming is necessary to avoid passing liquid soap through the whipping instrument. Therefore, in effect, the rotor is comprised of (1) a conveying section having a first part (gears **58** and **59**) for conveying liquid soap to gears **60, 61** and **62**, and a second part or intermediate stage (gears **60, 61** and **62**) for mildly beating the liquid soap and forming a light foam and (2) a beating section which receives the light foam and beats it intensively into a thick lather. The teeth or gears of the rotor **20** in conjunction with the teeth or gears of the housing member **18** produce an intensive beating effect upon the soap as the rotor **20** is rotated and thus provide a lather of rich and creamy consistency. The discharge end of the cylindrical member is disposed adjacent the handle **25** so that with one hand, the operator can actuate the control means and at the same time, receive the lather discharging from the discharge end of the cylindrical member **18**.

It is to be noted that the cylindrical member **18** is not directly heated by the heater **15** within the chamber **14** in the housing **11**. The member **18** is spaced from and thereby partially insulated from wall **17** of housing **11**. In prior designs, the cylindrical member was often in the heating chamber, thereby overheating and producing a lather that was light weight and filled with air bubbles. By spacing the housing member **18** from the wall **17** of housing **11**, member **18** will be partially insulated and the temperature thereof will be maintained within desirable limits. Vents **49** may be provided in the wall of housing **11** to further communicate annular space **48** with the atmosphere.

The later making machine of the present invention effectively utilizes a shaded-pole motor and improved whipping means to produce a uniformly rich and creamy lather in an efficient manner. Further, the machine is relatively inexpensive and convenient to use, ad thus is suitable for use in the home as well as in the barber shop.

While I have illustrated and described a presently preferred machine embodying my invention, it will be understood that the invention is not limited thereto, since it may be otherwise embodied within the scope of the following claims.

I claim:

1. In a lather-producing device, the combination of a horizontally elongated housing member having a bore therethrough and being open and substantially unobstructed at each end, one of said openings comprising a discharge opening, said housing member having a soap inlet opening in the top thereof adapted to receive liquid soap, said housing member having a plurality of axially extending grooves and paddles therein; a cylindrical whipping member rotatable in said housing member and having a plurality of surface grooves thereon there being radial clearance between said whipping member and the surface defining the bore in said housing member, said whipping member producing lather as it rotates and discharging the same through the discharge opening, said cylindrical whipping member having a first helically threaded section at least as long as the grooves in said cylindrical member, the angle of helix of said first threaded section being relatively small, and a second helically threaded section extending from adjacent said first section to a position beneath said soap inlet opening, the angle of helix of said second threaded section being considerably larger than the angle of helix of said first threaded section, said second threaded section conveying said liquid soap to said first threaded section and said first threaded section cooperating with said paddles in said housing member to produce a rich, creamy-textured lather, and a shaded-pole motor operably secured to said cylindrical whipping member for rotating said cylindrical whipping member.

2. A lather-producing device as in claim **1**, wherein the outer diameter of said whipping member is on the order of one and one-half inches.

3. A lather-producing device as in claim **1**, wherein the helix angle of the threads on said first section is on the order of 10 degrees.

4. A lather-producing device as in claim **1**, wherein the depth of each of the grooves in the housing member is on the order of one-eighth inch.

5. A lather-producing device as in claim 1, wherein the radial clearance between the exterior of the whipping member and the interior of the housing member is approximately 0.030 inch.

6. A lather-producing device as in claim 1, wherein the grooves in said cylindrical whipping member increasingly widen toward the discharge end of said cylindrical whipping member.

7. A lather-producing machine as in claim 1, wherein the grooves in the housing member are each constructed and arranged so that the width thereof is always more than the depth thereof.

8. In a lather-producing device for liquid soap, the combination of a horizontally elongated housing member having a bore therethrough and being open and substantially unobstructed at each end, one of said openings comprising a discharge opening, said housing member having a soap inlet opening in the top thereof adapted to receive liquid soap, said housing member having a plurality of grooves therein extending from a place adjacent the soap inlet opening to the discharge opening, each of said grooves in said housing member being axially oriented and each of said grooves having a rounded bottom, a cylindrical whipping member rotatable in said housing member and having a plurality of surface grooves and paddles thereon there being radial clearance between said whipping member and said housing member, said whipping member producing lather as it rotates and discharging the same through the discharge opening said grooves increasing in size towad the discharge end of said whipping member for facilitating extrusion of the lather, said cylindrical whipping member having a first helically threaded section coextensive with the grooves in said housing member, the angle of helix of said first threaded section being on the order of 10 degrees, and a second helically threaded section extending from adjacent said first section to a position beneath said soap inlet opening, the angle of helix of said second threaded section being considerably larger than the angle of helix of said first threaded section, said second threaded section conveying said liquid soap to said first threaded section and said first threaded section cooperating with said paddles in said housing member to produce a rich, creamy-textured lather and a shaded-pole motor operatively connected to said whipping member for rotating same.

9. A device for producing lather from liquid soap comprising a casing, receptacle means for liquid soap in said

casing, a horizontally elongated cylindrical member having a soap inlet opening intermediate the ends thereof in communication with said receptacle means for receiving liquid soap therefrom, said cylindrical member having a first open end and a second open discharge end, valve means for controlling the passage of liquid soap from said receptacle means into said cylindrical member, a cylindrical rotor member rotatably mounted within said cylindrical member for producing lather from the liquid soap, there being radial clearance between said rotor member and said cylindrical member, said cylindrical rotor member having a first helically threaded section thereon, the angle of helix of said first threaded section being relatively small, and a second helically threaded section extending from adjacent said first section to a position beneath said soap inlet opening in the elongated cylindrical member, the angle of helix of said second threaded section being considerably larger than the angle of helix of said first threaded section, said second threaded section conveying said liquid soap to said first threaded section and said first threaded section cooperating with paddles defined on said cylindrical member to produce a rich, creamy-textured lather, and a shaded-pole electric motor in said casing for driving said rotor member.

10. A device as in claim 9, wherein said casing has a chamber defined therein adjacent said liquid soap receptacle and a heater in said chamber for heating the liquid soap in said receptacle, said cylindrical member being spaced from said chamber so as to minimize heat transfer from said heater in said chamber to the walls of said cylindrical member.

11. A device as in claim 9, wherein said second threaded section comprises a first part for conveying liquid soap and a second part for lightly whipping the liquid soap into a light lather and conveying said light lather to said first threaded section for intensive beating.

References Cited by the Examiner

UNITED STATES PATENTS

512,528	1/94	Williams	146—190
2,057,791	10/36	Rolstad	252—359.5
2,756,102	7/56	Switzer	252—359.5
3,008,505	11/61	Pavia	146—18.4

NORMAN YUDKOFF, *Primary Examiner.*