

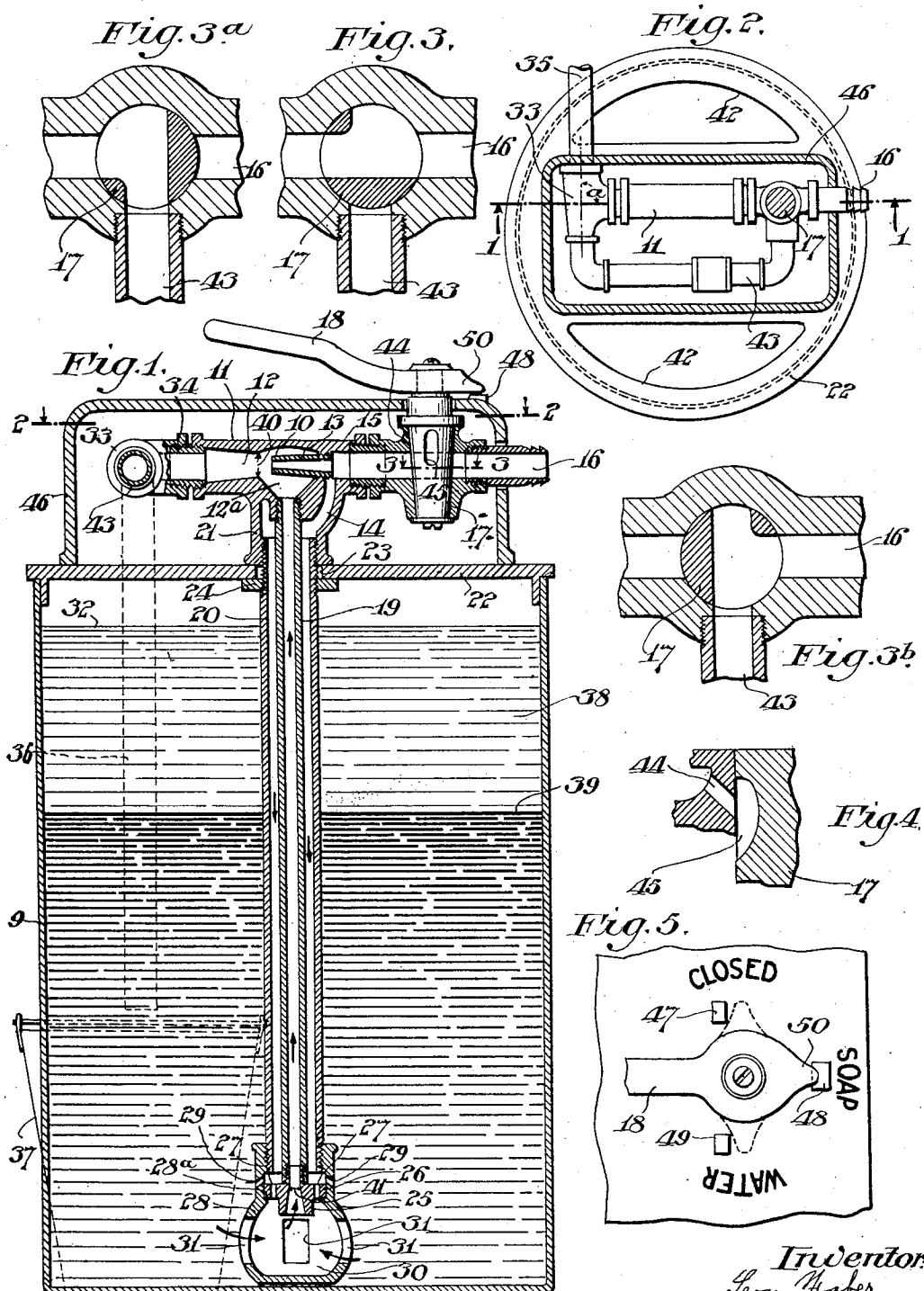
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L. FABER

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SOAP SUDSING APPARATUS

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Inventor:
Leon Faber
By *Charles L. Luck*
Attorney.

UNITED STATES PATENT OFFICE

LEON FABER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO FABER ENGINEERING COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF DELAWARE

SOAP-SUDSING APPARATUS

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My invention relates to improvements in soap-sudsing apparatus.

The practice used heretofore in garages for making soap suds used in washing automobiles has consisted in the placement of soap in a pail, the amount of soap being taken at random, addition of water, and stirring or mixing the soap and water to provide the soap suds. Soap suds made in this manner frequently contain an appreciable quantity of undissolved soap particles which is largely responsible for unsightly streaks left on the painted surfaces of the car bodies after the washing operation. Furthermore, the manner used heretofore for making soap suds has been very wasteful, for the reason that in most cases no discretion is used by the car washer as regards the least amount of soap required for the purpose of obtaining satisfactory soap suds. The tendency has been to use considerably more soap than is necessary for the purpose of obtaining a pail of soap suds. This is particularly true when soft or semi-hard soaps are supplied. Furthermore, the soap supply in garages is generally handled in a haphazard way, that is, it is generally left exposed in barrels or other containers after the same are opened, and for this reason dust and grit accumulate in the soap and, furthermore, an appreciable amount of the same is wasted by careless handling during transfer of the soap from the barrels or containers to the pails for mixing with water.

In accordance with my invention, soap suds, particularly mixtures of soap and water, are efficiently and quickly made by apparatus placed over the open end of a barrel or other container containing soap, which may be liquid, soft or semi-hard, and a proper mixture of soap and water withdrawn quickly from the barrel by the action of suitable ejector mechanism to which water is supplied under control of a single valve readily manipulated by the car washer, the action being such that practically every particle of soap is dissolved or broken up into suds formation whereby the difficulty experienced heretofore, as regards appearance of streaks on the painted surfaces of the car bodies is eliminated.

More particularly in accordance with my invention, soap-sudsing or mixing apparatus is constructed as a unit adaptable for ready placement over the open end of a barrel or other suitable receptacle containing soap, the unit including ejector mechanism, a water-supply connection for such mechanism, tubular elements disposed one within the other and extending downwardly from the mechanism into the barrel to a point in proximity to the bottom thereof, one of said members communicating with the water-supply connection, the other member communicating with the interior of the ejector mechanism and providing a passage for withdrawal of soap-and-water mixture from the barrel, and a single valve movable to different positions to shut off the water supply, provide for discharge of soap-and-water mixture from the apparatus, or provide for discharge of clear water from the same.

My invention resides in apparatus of the character hereinafter described and claimed.

For the purpose of illustrating my invention, one embodiment thereof is shown in the drawing, in which

Figure 1 is a vertical, sectional, elevational view of apparatus embodying my invention the section being taken on the line 1—1 in Fig. 2;

Fig. 2 is a reduced, sectional view, the section being taken on the line 2—2 in Fig. 1;

Figs. 3, 3a, and 3b are sectional views showing the different control positions of the control valve of the apparatus, the section taken on line 3—3 in Fig. 1;

Fig. 4 is a fragmentary sectional view, illustrating a connection made by the control valve when in the control position of Fig. 3b; and

Fig. 5 is a fragmentary plan view.

Referring more particularly to Fig. 1, the stop-sudsing or mixing apparatus includes ejector mechanism, designated generally by reference numeral 10, disposed within the casing 11 provided with the passage 12. The nozzle element 13 of the ejector mechanism is supported in a suction chamber 12a opening into passage 12 and directed as shown. Casing 11 is provided with the passage 14 com-

communicating with the inlet end portion 15 of the casing to which is connected a suitable water-supply connection 16, through a control valve 17 of any suitable construction movable by a handle 18 to the different control positions shown in Figs. 3, 3a and 3b.

A vertically disposed tubular member 19 extends downwardly from the ejector mechanism into a barrel 9 containing soap, and communicates at its upper end with the suction chamber.

A second tubular member 20 is disposed in surrounding relation, preferably concentric with respect to member 19, and is screwed at its upper end into the depending portion 21 of casing 11, such arrangement providing for communication between water-supply connection 16 and the upper end of member 20 by way of passage 14.

The base 22, which rests upon the upper open end of barrel 9, is provided with the central opening 23 through which members 19 and 20 pass, and is clamped between casing portion 21 and the nut 24 threaded on member 20.

A nipple 25 is threaded into the lower open end of member 19, as shown, and is provided with the flange 26 having suitable openings 27 extending therethrough and arranged circumferentially about the same. A head 28 is threaded on the lower open end of member 20 and is provided with the shoulder 28a engaging flange 26 of nipple 25, whereby the latter is locked in assembled relation with respect to the lower end of member 19. The head 28 is provided with openings 29 extending through the same and communicating with the lower end of member 20 and directed downwardly for the purpose hereinafter explained. The lower portion of head 28 is enlarged to provide a mixing chamber 30 communicating with the interior of barrel 9 by way of ports or openings 31.

When it is desired to obtain a pail of soap suds or soap-and-water mixture, control valve 17 is moved by handle 18 to the position shown in Figs. 1 and 3 to establish communication between the water-supply connection 16 and the inlet end portion 15 of casing 11, at which time a certain portion of the water will pass through nozzle 13 and issue therefrom at relatively high velocity, the remaining portion of the water passing downwardly through passage 14 and the passage between members 19 and 20, and thence through openings 27 and 29 in the form of fine jets. The jets of water issuing from openings 29 operate to mix with or agitate the soap in the region immediately exterior of head 28 and form a soap-and-water mixture for passage through openings 31 into mixing chamber 30 in which the water issuing from openings 27 in the form of fine jets is added and thoroughly mixed in by the agitating action of such jets, after which the mixture is forced upwardly

through member 19 under the action of atmospheric pressure on the free surface of the contents of the barrel at level 32, such pressure being effective for this purpose due to the action of ejector mechanism 10 according to the well known principle.

The soap-and-water mixture is discharged from the apparatus through the T-coupling 33 connected to the outlet end of casing 11 by the nipple 34, and a suitable outlet connection 35 to which is connected a flexible hose 36 extending downwardly with its lower open end over a pail or other suitable receptacle 37.

The respective dimensions of ejector mechanism 10, passage 14 and jet openings 27 and 29 are such that the volumetric rate of water-supply by way of jets 27 and 29 substantially equals the volumetric rate of withdrawal of the soap-and-water mixture by way of member 19. The level 32 of the contents of the barrel therefore remains substantially constant, that portion 38 of the water-supply to the barrel by way of jets 27 and 29 which does not enter into the mixture withdrawn by way of member 19, collecting above the level 39 of the heavier soap at a volumetric rate substantially equal to the volumetric rate of consumption of the soap. The level 39 of the soap-supply therefore drops gradually as the apparatus is used.

From the foregoing it will be seen that the construction is such that the volumetric rate of withdrawal of the soap-and-water mixture is balanced with that of the volumetric rate of water-supply. In this connection, satisfactory results have been obtained by making the throat 40 of the ejector mechanism nine-sixteenths of an inch in diameter, the throat 41 of nipple 25 three-eighths of an inch in diameter, in construction wherein the distance between the longitudinal axis of casing 11 and the lower tip of nipple 25 is 32 inches. Fig. 1 is drawn approximately to scale with these dimensions. While such dimensions and relation of dimensions have been found to provide for satisfactory operation, it will be appreciated that the same may vary over a wide range, depending upon conditions.

Base 22 of the apparatus may be provided with openings 42 to decrease the weight of the apparatus and to insure that the free surface of the contents of the barrel will at all times be under atmospheric pressure.

When the desired amount of soap suds or soap-and-water mixture has been discharged into pail 37, valve 17 is moved into the position thereof shown in Fig. 3a to shut off the water-supply to casing 11.

If the supply of soap suds or soap-and-water mixture obtained is of greater consistency than desired, the same is diluted by addition thereto of clear water, for which purpose valve 17 is moved to the position thereof shown in Fig. 3b to provide communication between water-supply connection 16

and a suitable by-pass connection 43 leading to T-coupling 33. The angle a between the longitudinal axis of outlet connection 35 and the axis of casing 11 is substantially 90 degrees to insure against any appreciable tendency of the flow of clear water through coupling 33 being effective to produce an ejector action and possibly withdraw some soap-and-water mixture upwardly through member 19 into mixture with the clear water. Such action is further prevented by the vent opening 44 which is placed in communication with the interior of casing 11 by the passage 45 in valve 17 which registers with opening 44, as shown in Fig. 4, when the valve is in the position thereof shown in Fig. 3b.

A suitable cover 46 is fitted over the apparatus and forms with base 22 an enclosing casing therefor.

As shown in Fig. 5, cover 46 may be provided with upwardly extending lugs 47, 48 and 49 arranged to indicate the respective positions of valve 17 whereat communication is cut off between water-supply connection 16 and the inlet end portion 15 of casing 11, soap-and-water mixture discharged from the apparatus, or clear water discharged. Lugs 47 and 49 may extend upwardly to such height that the same are engaged by the extended portion 50 of lever 18, as indicated by dash lines, to provide stops to prevent clockwise rotation of lever 18 beyond the "water" position, and counter-clockwise rotation of the lever beyond the "closed" position.

From the foregoing it will be seen that improved soap-sudsing or soap-and-water mixing apparatus has been provided which may be readily and quickly placed upon the open end of a barrel of liquid soap, and the desired amount of soap-and-water mixture dispensed by manipulation of valve 17, the action being such that the proper proportion of water and soap is maintained and the soap supply efficiently used. When the level 39 of the soap supply has dropped to the lower tip of nozzle 25, the dispensing unit is lifted from the barrel, the small amount of soap remaining dumped into a fresh barrel and the unit then placed in position upon the latter.

While but one embodiment of the invention has been disclosed, it will be appreciated that various changes may be made, such as in the size, shape and arrangement of the parts, without departing from the spirit of the invention, or the scope of the claims.

The invention claimed is:

1. Soap-sudsing apparatus comprising a container for soap, an ejector comprising a casing and nozzle structure therein, a mixing chamber within said container and in communication therewith and disposed within said soap, a water conduit connecting the high pressure side of said nozzle and said chamber, means for discharging jets of water

from said conduit into the soap exteriorly of said mixing chamber in the region adjacent the chamber, and a soap-and-water mixture conduit connecting said chamber and the low pressure side of said nozzle.

2. Soap-sudsing apparatus comprising a container for soap, an ejector comprising a casing and nozzle structure therein, a mixing chamber within said container and in communication therewith and disposed within said soap, a water conduit connecting the high pressure side of said nozzle and said chamber, means for discharging jets of water from said conduit into the soap exteriorly of said mixing chamber in the region adjacent the chamber, means for discharging jets of water from said conduit into the soap-and-water mixture within said mixing chamber, and a soap-and-water mixture conduit connecting said chamber and the low pressure side of said nozzle.

3. Apparatus for producing within a soap container a soap-and-water mixture, comprising a mixing and delivery unit detachably supported upon the container at an opening thereof, said unit comprising a single ejector having a nozzle and a suction chamber, discharge means in communication with said ejector, a water supply connection to said ejector, a mixing chamber having impervious wall structure with relatively large openings disposed within the soap in said container, a conduit comprised in said unit communicating with said water connection and with said mixing chamber for delivering water thereto for effecting a soap-and-water mixture, second conduit comprised in said unit delivering said mixture from said mixing chamber to said suction chamber, and a by-pass from said water connection to the discharge of said unit for delivering clear water thereto.

4. Apparatus for producing within a soap container a soap-and-water mixture, comprising a mixing and delivery unit detachably supported upon the container at an opening thereof, said unit comprising an ejector having a nozzle and a suction chamber, a water supply connection to said ejector, a mixing chamber, having a wall provided with ports, disposed within the soap in said container, a conduit comprised in said unit communicating with said water connection and with said mixing chamber for delivering water thereto for effecting a soap-and-water mixture, and a second conduit comprised in said unit delivering said mixture from said mixing chamber to said suction chamber, one of said conduits disposed within the other.

5. Apparatus for producing within a soap container a soap-and-water mixture, comprising a mixing and delivery unit detachably supported upon the container at an opening thereof, said unit comprising an ejector having a nozzle and a suction cham-

ber, a water supply connection to said ejector, discharge means in communication with said ejector, a mixing chamber having openings disposed within the soap in said container, a
 5 conduit comprised in said unit communicating with said water connection and with said mixing chamber for delivering water thereto for effecting a soap-and-water mixture, and a
 10 second conduit comprised in said unit delivering said mixture from said mixing chamber to said suction chamber, one of said conduits disposed within the other.

6. Apparatus for producing within a soap container a soap-and-water mixture, comprising a mixing and delivery unit detachably supported upon the container at an opening thereof, said unit comprising an ejector having a nozzle and a suction chamber, a water supply connection to said ejector, discharge means in communication with
 20 said ejector, a mixing chamber having openings disposed within the soap in said container, a conduit comprised in said unit communicating with said water connection and with said mixing chamber for delivering
 25 water thereto for effecting a soap-and-water mixture, a second conduit comprised in said unit delivering said mixture from said mixing chamber to said suction chamber, one of said conduits disposed within the other, a valve intervening between said water supply connection and said nozzle and first named conduit, and a by-pass from said
 30 water supply connection to the discharge of said unit, said valve in one position closing said first-named conduit and directing water from said supply connection through said by-pass, and in another position closing said
 35 by-pass and directing water from said supply connection to said nozzle and said first-named conduit.

7. Apparatus for producing within a soap container a soap-and-water mixture, comprising a mixing and delivery unit detachably supported upon the container at an opening thereof, said unit comprising an ejector having a nozzle and a suction chamber, a water supply connection to said ejector, discharge means in communication with said
 45 ejector, a mixing chamber having openings disposed within the soap in said container, a conduit comprised in said unit communicating with said water connection and with said mixing chamber for delivering water thereto for effecting a soap-and-water mixture, a
 50 second conduit comprised in said unit delivering said mixture from said mixing chamber to said suction chamber, a valve intervening between said water supply connection and said nozzle and first-named conduit, a by-pass from said water supply connection around said nozzle to the discharge means of said unit, said valve in one position closing
 55 said supply connection to said nozzle and said first-named conduit to prevent flow of

water to all ejector structure in communication with the discharge means of the unit and directing water from said supply connection through said by-pass, and in another position closing said by-pass and directing
 70 water from said supply connection to said nozzle and said first-named conduit.

8. Apparatus for producing within a soap container a soap-and-water mixture, comprising a mixing and delivery unit detachably supported upon the container at an opening thereof, said unit comprising an ejector having a nozzle and a suction chamber, a water supply connection to said ejector, discharge means in communication with said
 75 ejector, a mixing chamber having openings disposed within the soap in said container, a conduit comprised in said unit communicating with said water connection and with said mixing chamber for delivering water thereto for effecting a soap-and-water mixture, a
 80 second conduit comprised in said unit delivering said mixture from said mixing chamber to said suction chamber, a valve intervening between said water supply connection and said nozzle and first-named conduit, a by-pass from said water supply connection around said nozzle to the discharge means of said unit, said valve in one position closing
 85 said supply connection to said nozzle and said first-named conduit to prevent flow of water to all ejector structure in communication with the discharge means of the unit and directing water from said supply connection through said by-pass, and in another
 90 position closing said by-pass and directing water from said supply connection to said nozzle and said first-named conduit, and means operable when water is by-passed to the discharge means for relieving suction in
 95 said ejector.

LEON FABER.

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