United States Patent

Patterson

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[54] METHOD FOR SOAP BARS HAVING MARBLE-LIKE DECORATION

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[22] Filed: **Feb. 4, 1970**

[21] Appl. No.: **8,494**

[52] **U.S. Cl.** **264/75,** 25/8, 159/DIG. 14, 252/367, 264/171, 264/211, 264/245

[51] **Int. Cl.**.....**B29f 3/12,** B32b 31/30, C11d 13/18

[58] **Field of Search**.....264/75, 73, 245, 211, 349, 264/173, 176, 171; 18/8; 252/134, 109, 371, 367, 370; 159/DIG. 14; 25/8

[56] **References Cited**

UNITED STATES PATENTS

2,640,033	5/1953	Marshall	25/8
3,485,905	12/1969	Compa et al	264/75
2,682,081	6/1954	Fisch	264/75
2,815,033	12/1957	Braunlich	264/75

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Assistant Examiner—Jeffery R. Thurlow
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[57] **ABSTRACT**

Method of producing marble-like appearance in a soap bar in which a saponaceous dye solution having color contrast with the soap of the bar is injected through a screw end opening in a plodder screw and is distributed through a soap mass being extruded in a manner producing contrasting color streaks therethrough subdued at their boundaries for indistinct mergence with the extruded mass.

14 Claims, 6 Drawing Figures

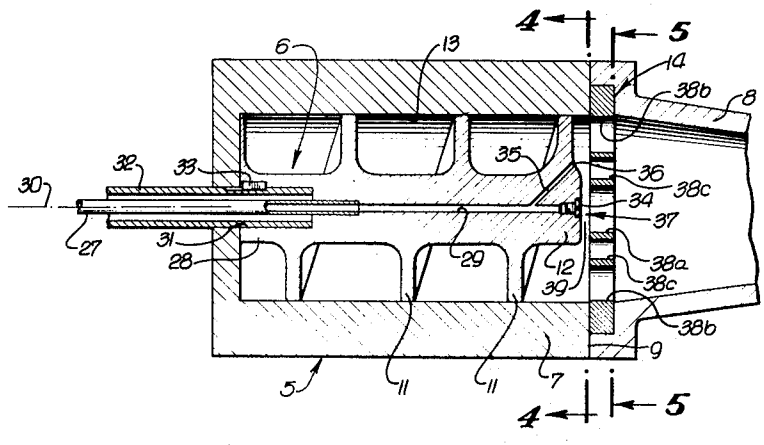
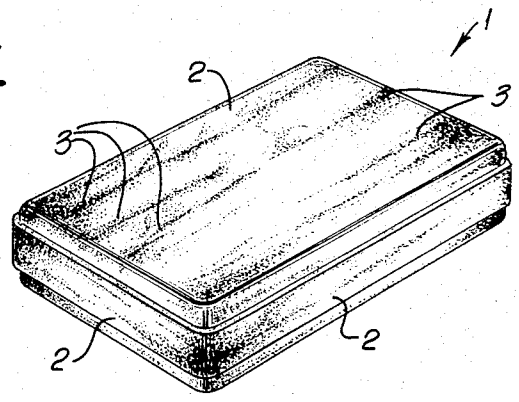


FIG. 1.



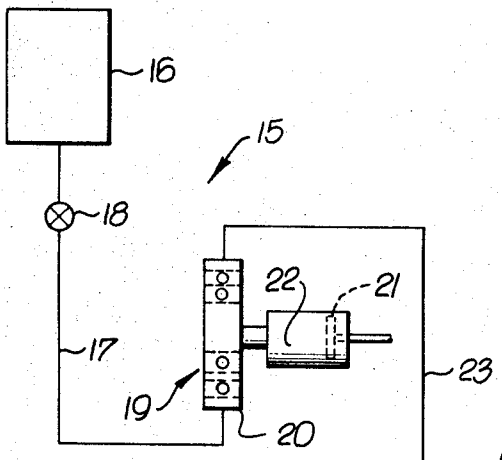


FIG. 2.

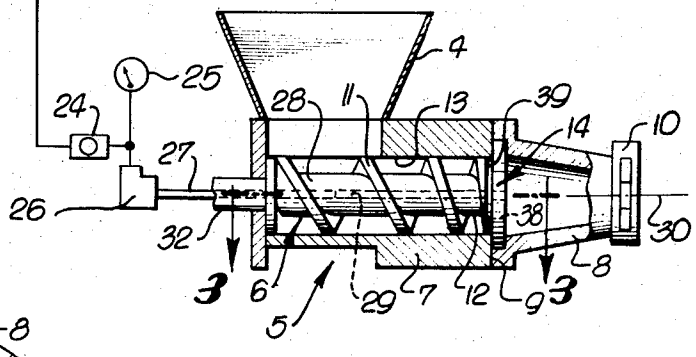


FIG. 6.

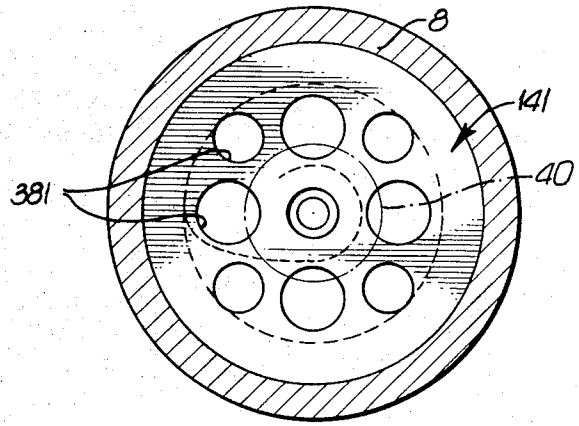


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FIG. 3.

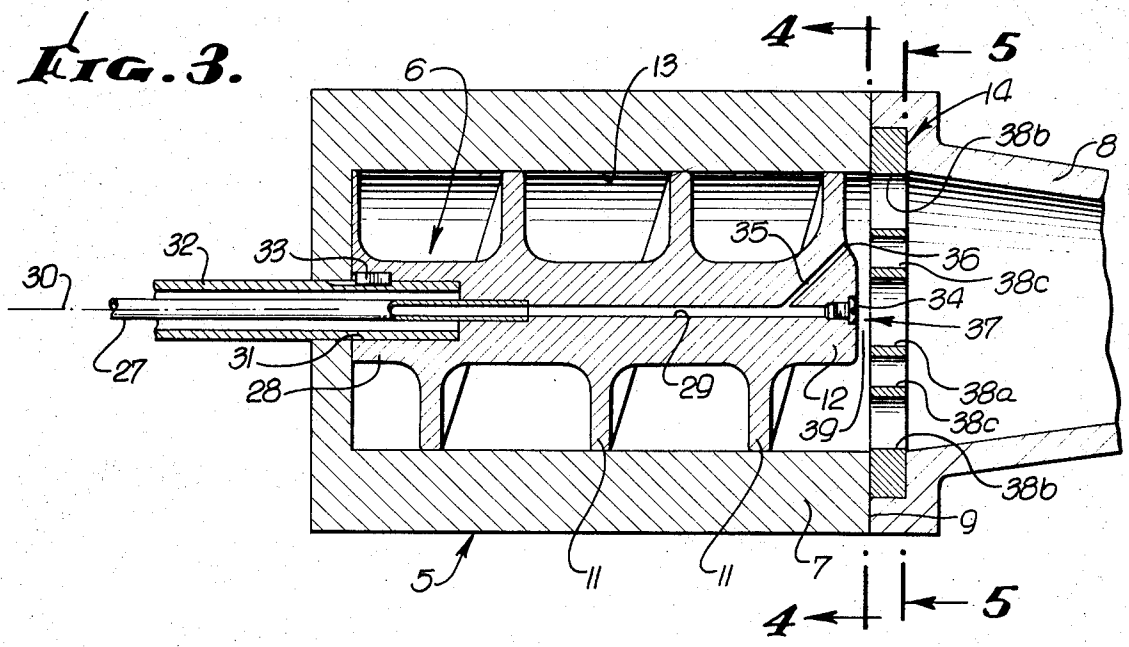


FIG. 4.

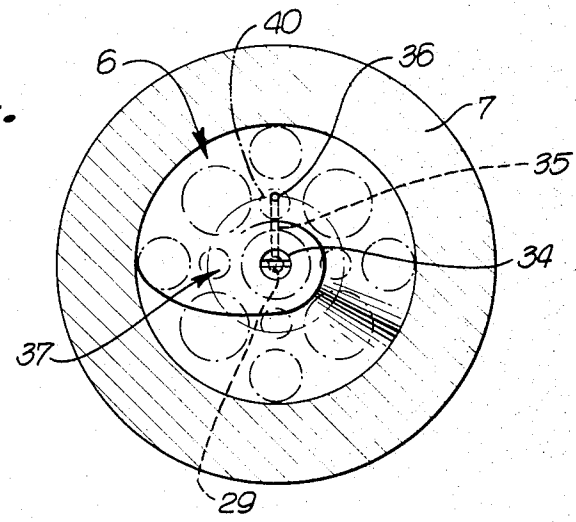
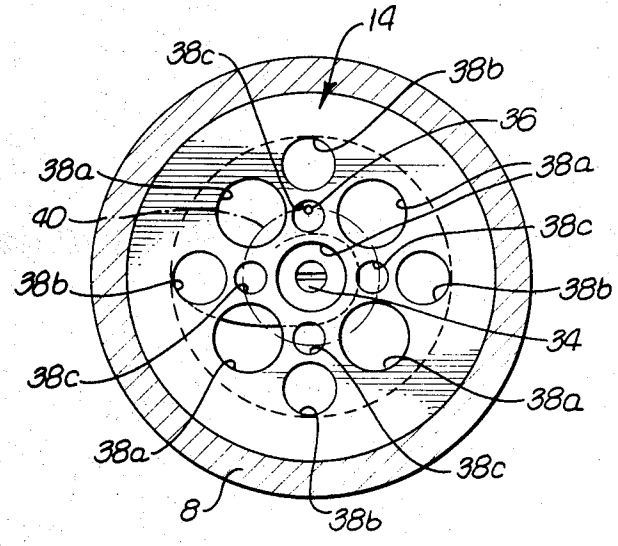


FIG. 5.



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METHOD FOR SOAP BARS HAVING MARBLE-LIKE DECORATION

BACKGROUND OF THE INVENTION

1. Field of the Invention

Decoration of bar soap has generally been limited to overall coloring and surface ornamentation with stampings. Use of contrasting color decoration in a single soap bar, particularly such decoration having a marble-like appearance, has been long sought, but not obtained in a commercially acceptable soap bar. The reason appears to be either the difficulty of duplicating the random yet regular pattern characteristic of marble and particularly at more than surface portions of the bar, or the deterioration of bar properties coincident with the introduction of foreign material into the bar. Such deterioration is manifested by cracking of the bar, in production or prematurely in use.

2. Prior Art

As indicated, attempts have been made in the past to obtain marbleized and/or multicolored patterns of decoration in soap bars. These efforts have included elaborate dies which coextrude differently colored soap materials in predetermined patterns and complicated apparatus for introducing preformed colored bodies into a soap mass to be partially mixed therewith. In such methods the interface of colored and background soap is likely to be too sharp for a marble-like appearance and because the interface is a distinct boundary, cracking of the bar therealong is a likely occurrence. Such cracking is detrimental to building consumer acceptance of a marbleized soap bar.

SUMMARY OF THE INVENTION

Accordingly, it is a major objective of the present invention to provide method for the production of soap bars having a marble-like appearance in which true marbleizing is realized and without the hitherto concomitant complexities in apparatus, formulation or extrusion.

The invention may be considered to have reference to the operation of a soap plodder or other final soap forming device in which a mass of formable soap is advanced by a rotating screw under compression through a tubular barrel, a apertured pressure plate beyond the screw end, and a convergent outlet. In accordance with the invention, a method is provided for producing bar soap having a marble-like appearance that includes injecting from the pressure plate end of the screw through an opening offset from the screw axis a colorant fluid having color contrast with the soap mass and in relatively small proportion, and extruding the resulting mixture through apertures so arranged in the pressure plate as to distribute and maintain the colorant fluid unevenly within the soap mass to produce in and through the soap convergingly discharged from the plodder color streaks subdued at their boundaries for indistinct mergence with the extruded mass. Particular features of the method include: injecting a saponaceous solution of colorant e.g. a dye solution containing 2 to 25 percent by weight soap into the extruded soap mass in an amount equal to between 0.1 to 10 percent of the soap mass weight; displacing the colorant fluid from its injection locus as a coherent stream in the soap mass moving between the injection opening and the pressure plate apertures; arranging the pressure plate apertures in a manner to preferentially distribute colorant fluid through the pressure plate apertures; introducing the colorant fluid into the soap mass from the opening along a circular locus uniformly spaced from the pressure plate; maintaining a series of apertures downstream from the locus of colorant fluid injection in the soap mass; injecting the colorant fluid uniformly or intermittently; and longitudinally distributing the colorant fluid through the soap mass downstream of the pressure plate generally parallel to the axis of the convergent outlet by the convergent movement of the soap mass containing the colorant fluid passing through the outlet.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a marble-like appearing soap bar according to the invention;

FIG. 2 is a partly schematic view of a final soap plodder and colorant fluid feed system therefor, the plodder being shown in section;

FIG. 3 is a horizontal section of the plodder taken on line 3—3 in FIG. 2 and greatly enlarged;

FIG. 4 is an end elevation view of the plodder screw and barrel, taken along line 4—4 in FIG. 3 and showing the plodder pressure plate apertures in phantom outline;

FIG. 5 is an elevation view of the plodder and pressure plate taken along line 5—5 in FIG. 3; and

FIG. 6 is a view like FIG. 5 showing an alternate aperture arrangement in a pressure plate.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The term "colorant fluid" herein refers to a fluent or fluid material, solid or liquid having color contrast with a soap mass into which it is injected. The colorant fluid is preferably liquid and saponaceous solution e.g. of a dye or pigment but may also be a suspension or emulsion of pigment or dye in water, alcohol, glycerine or other liquid compatible with the soap mass, or be a fluent, powdered pigment or dye.

The typical final product obtainable with the present method is shown in FIG. 1. Soap bar 1 has marbled top, side and end surfaces 2 marbled with contrasting three-dimensional streaks 3 and the marbling effect continues throughout the bar, so that upon wearing through use, the marble pattern continues with subtle variation in geometry and nearly imperceptible nuance of color change at different levels of the bar as the veins of coloration are gradually progressively exposed. While the term "marble-like" in appearance best describes the decorative effect seen in soap bar 1, words may be used to convey the aesthetic impression. Thus, a marble-like appearance is one in which numerous, discrete contrasting color streaks or striations each with variations in width and depth along their length appear in approximately parallel array. The appearance is distinguished from mere striping in the irregularity of the striation contour and particularly by the manner in which the color streaks are subdued at their boundries for indistinct mergence with the extruded mass.

The base material or "soap mass" for the soap bar 1 may be made generally as for a milled soap. That is it may consist mainly of the sodium salts of the fatty acids of a mixture of 18 percent coconut oil and 82 percent tallow, rancidity preventing agents in minor proportions, 1.0 percent perfume, 0.6 percent titanium dioxide whitening agent, and approximately 13 percent moisture. This formulation is prepared by methods for making milled soap that are well known in the soap industry. These methods typically include boiling the mixture of fats with caustic soda to obtain "kettle" soap, mixing in rancidity preventing agents, drying to obtain white soap chips having approximately 13 percent moisture content, admixing 1.0 percent perfume and 0.6 percent titanium dioxide with the chips, kneading and working by milling and extruding first through a preliminary plodder to obtain spaghetti-like noodles and then through a final plodder to obtain a solid, rod-like extrusion termed a "plodder strip," which is self-supporting but moldable. This plodder strip is cut into appropriate length sections and molded into the final bar shap in suitable dies. The above-stated formulation and preparation apply to particular techniques actually employed in the development of the soap bar depicted at 1 in the drawing, and is intended to be illustrative of milled soap manufacture and suggestive of other suitable means of accomplishing the same result. Otherwise formed moldable soap masses may also be marbleized according to the invention with whatever adjustment of colorant fluid viscosity, composition and the like may be appropriate.

The present method will be described with respect to an illustrative embodiment as commencing with the introduction of the spaghetti-like noodles of milled soap from the milling

and preliminary plodding operations into hopper 4 of final plodder 5. The screw 6 is mounted for axial rotation within the barrel 7 of the plodder 5 and carries the soap mixture forward (left to right) through the plodder barrel ultimately for discharge through the compression cone 8 fixed in the end 9 of the barrel 7 by means not shown, as a continuation thereof, and outlet die 10. The soap mixture is carried on the screw flights 11 of the screw 6. It will be noted that toward the front end 12 of the screw 6 the pitch distance of screw flights 11 is progressively reduced so that soap mixture between the flights and the closely enclosing interior wall 13 of the barrel 7 is progressively compacted into a dense soap mass which is continually urged forward toward the discharge end of the barrel 7. Final compression occurs in the compression cone 8 and outlet die 10 through which the soap mixture is forcibly urged by the screw 6. The highly compacted soap mass from outlet die 10 is taken for final forming as above described.

Thusfar described, the final plodder 5 is generally conventional. The present method involves additional apparatus to the plodder in the form of a pressure plate 14 which is known in previous plodders to maintain adequate back pressures in the plodder barrel 7, but which has a special purpose and configuration for use in the invention method, and means schematically depicted in FIG. 2 for the introduction of color contrasting colorant fluid into the plodder 5.

With reference to FIG. 2 the saponaceous dye solution or other colorant fluid feed apparatus is shown generally at 15 and includes a supply tank 16, line 17, with valve 18 which is normally open during operations, a metering pump 19 comprising a valve chamber 20 and a piston 21 mounted for reciprocal metering movement by means not shown in cylinder 22, line 23 having ball check valve 24 against reverse dye solution flow, a pressure gage 25 and a swivel coupling 26, connecting to a feed pipe 27 threaded axially into rear end 28 of screw 6 for rotation therewith, for communicating the supply tank 16 with bore 29 formed along the longitudinal axis 30 of the screw 6.

As best shown in FIG. 3 the feed pipe 27 enters the rear end 28 of the screw 6 concentrically with counterbore 31 and drive shaft 32 which is connected to a motor (not shown) and keyed at 33 to the screw to rotatively drive the screw 6. Bore 29 extending axially through the screw 6 is blocked at screw front end 12 with plug 34. A port 35 is provided forwardly and radially outward from the bore 29 terminating in an injection opening 36 on the front fact 37 of the screw 6.

The radial offset of the opening 36 from the axis 30 of the screw 6 is to be noted to be substantially equal to that of certain of the apertures 38 in the pressure plate 14. With this arrangement reduced pressure zones are provided opposite the entry locus of colorant whereby the solution may pass rapidly from opening 36 toward the apertures 38 across the space at 39 which is relatively small, e.g. from 0.125 inches to 1 inch in a 4 inch final plodder and generally less than 0.75 inch. The feed inlet locus is concentric with the screw axis 30 and typically will have a radius equal to between 35 and 65 percent of the screw radius.

It has been found providing mainly translational or axial flow from the point of introduction of colorant fluid at opening 36 to the pressure plate apertures 38 restricts intermixing of the dye solution with the soap mass to a degree precluding overall tinting of the soap mass rather than distinct color streaks, but permits a confluence of dye solution and soap mass along the edges of the color injection permitting achieving the desired marbled distribution and lack of edge definition in the compression cone 8. Accordingly the colorant fluid is desirably displaced from its injection locus in the soap mass i.e. where it was injected into the moving soap mass, without intimate dispersal or mixing, that is, the injected colorant fluid moves as a coherent stream carried by the soap mass moving between the injection opening and the pressure plate.

Initial distribution of the dye solution or other colorant fluid into the soap mass is realized by moving the opening 36 about a circular locus 40 uniformly spaced i.e., equidistantly spaced from the pressure plate (see FIG. 4) coincidentally with the screw 6 rotation. In this manner, the opening 36 and thus the point of introduction of the colorant fluid varies through the soap mass regularly in time. The colorant fluid may be considered to be helically distributed through the soap mass which has passed the opening 36 and to be substantially maintained in the helical locus in the soap mass moving toward the pressure plate 14.

The marble effect may be increased or varied in pattern or intensity by pulsed or constant rates of introduction of saponaceous dye solution or other colorant fluid. Thus metering pump 19 (FIG. 2) may be a single or multi-cylinder reciprocating pump or constant rate of discharge gear pump operated to correspondingly introduce intermittent or continuous quantities of color contrasting solution into the soap mass.

The saponaceous dye solution or other colorant fluid put into the soap mass is carried forward substantially in its injected location subject to intermixing movement of the soap matrix to the pressure plate 14, as described. The pressure plate apertures define zones of lower pressure toward which the soap mass moves. By various arrangements of these apertures in size and placement the flow rate and direction of the soap mass may be varied and specifically the quantity and location of the injected colorant fluid may be controlled relative to the soap mass. In FIG. 5, pressure plate 14 is shown to have three sets of different size holes. FIrst there are five large holes 38*a* at the center and at 2, 5, 8 and 11 0'clock Then there are four medium size holes 38*b* at approximately 12 3, 6 and 9 0'clock. In addition, there are small holes 38*c* radially inward from the medium size holes 38*b*. In FIG. 4, the relation of these holes 38*1–c* to the locus 40 of injection opening 36 may be seen. As shown, injection opening 36 is directly opposite each of holes 38*c* in its rotation and also is successively opposite portions of each of holes 38*a*. With the spacing 39 as described and the relative location of the apertures 38*a* and *c* successively opposite the inlet 36 the marble pattern defining may be discerned to be the result of helical introduction of saponaceous dye solution or other colorant fluid into a continually advancing soap mass with translational axial movement substantially directly through an opposite or angularly spaced aperture which disrupts both the solidity and the rotation of the soap mass and forces soap mixture through the very apertures through which the saponaceous dye solution passes. Passage into apertures 38 of the pressure plate 14 divides the mixture momentarily into multiple strands. After passage through the apertures, the mixture spreads momentarily and then unites under the restrictive force of the compression cone 8. The colorant fluid having passed through the apertures is longitudinally distributed as the soap mass is elongated for passage though the compression cone outlet. The soap-colorant mixture then compresses into an integral bar as it emerges from the forming die with the pattern creating contrasting color saponaceous dye solution well distributed through the mass, but without being excessively mixed therewith.

FIG. 6 shows an alternate arrangement of apertures 381 in pressure plate 141 in which the small holes 38*c* have been omitted to produce a variant marble effect which is particularly pronounced at the soap bar surface and less persistent through the bar in use.

I claim:

1. In the operation of a soap plodder in which a mass of formable soap is advanced by a rotating screw under compression through a tubular barrel, an apertured pressure plate beyond the screw end, and a convergent outlet; the method of producing bar soap having marble-like appearance that includes injecting from the pressure plate end of the screw through a screw end opening offset from the screw axis a colorant fluid having color contrast with the soap mass and in relatively small proportion, and extruding the resulting mixture through apertures so arranged in the pressure plate as to distribute and maintain the colorant fluid unevenly within the

soap mass to produce in and through the soap convergingly discharged from the plodder color streaks subdued at their boundaries for indistinct mergence with the extruded mass.

2. Method according to claim 1 including injecting a saponaceous colorant solution into the soap mass as said colorant fluid.

3. Method according to claim 1 including displacing colorant fluid from its injection locus as a coherent stream in the soap mass moving between said injection opening and said pressure plate.

4. Method according to claim 1 including also arranging the pressure plate apertures in a manner to preferentially distribute colorant fluid therethrough.

5. Method according to claim 1 including also rotating said feed inlet with the screw in a locus less than 0.75 inch from said pressure plate.

6. Method according to claim 1 including also two sets of different diameter apertures in the pressure plate and passing successive portions said soap mass with dye solution therein alternately through apertures of one or another of said sets.

7. Method according to claim 1 injecting adding colorant fluid to the soap mass in an amount equal to between 0.1 and 10 percent of the soap mass weight.

8. Method according to claim 2 including also dissolving from 2 to 25 percent by weigh of soap in said colorant solution prior to injecting the solution into said soap mass.

9. Method according to claim 1 in which said colorant fluid is introduced into the soap mass from said opening along a circular locus uniformly spaced from said pressure plate.

10. Method according to claim 9 including also injecting a saponaceous dye solution containing from 2 to 25 percent by weight of soap into said soap mass in an amount equal to between 0.1 and 10 percent of the weight of the soap mass.

11. Method according to claim 1 including also longitudinally distributing said colorant fluid through the soap mass downstream of said colorant fluid through the soap mass downstream of said pressure plate generally parallel to the axis of said convergent outlet by the convergent movement of the soap mass containing said fluid passing through said outlet.

12. Method according to claim 1 including maintaining a series of apertures downstream from the locus of colorant fluid injection into the soap mass.

13. Method according to claim 1 in which said inlet introduces said saponaceous dye solution into the soap mass along a circular locus concentric with the screw axis an having a radius equal to between 35 and 65 percent of the screw radius.

14. Method according to claim 1 in which said saponaceous dye solution is introduced intermittently into the soap mass from said inlet.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3676538 Dated July 11, 1972

Inventor(s) Charles B. Patterson

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 33; "these holes 381-c to the locus 40 of injection opening 36 may" should read -- these holes 38a-c to the locus 40 of injection opening 36 may --

Column 5, line 21; "7. Method according to claim 1 injecting adding colorant" should read -- 7. Method according to claim 1 including adding colorant --

Column 6, lines 10 and 11; after "downstream of said" on line 10 please delete "colorant fluid through the soap mass downstream of said"

Column 6, line 19; "along a circular locus concentric with the screw axis an having" should read -- along a circular locus concentric with the screw axis and having --

Signed and sealed this 26th day of December 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

FORM PO-1050 (10-69)

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* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334