United States Patent

Matthaei

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[54] **METHOD FOR THE MANUFACTURE OF MARBLEIZED SOAP BARS**

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[52] **U.S. Cl.** **264/75**

[51] **Int. Cl.** **B29f 3/12**

[58] **Field of Search** 264/75, 73, 148, 102

[56] **References Cited**

UNITED STATES PATENTS

45,164	11/1864	Moreau et al.	264/73
2,987,102	6/1961	Heinrichs	264/73
3,485,905	11/1969	Compa et al.	264/75

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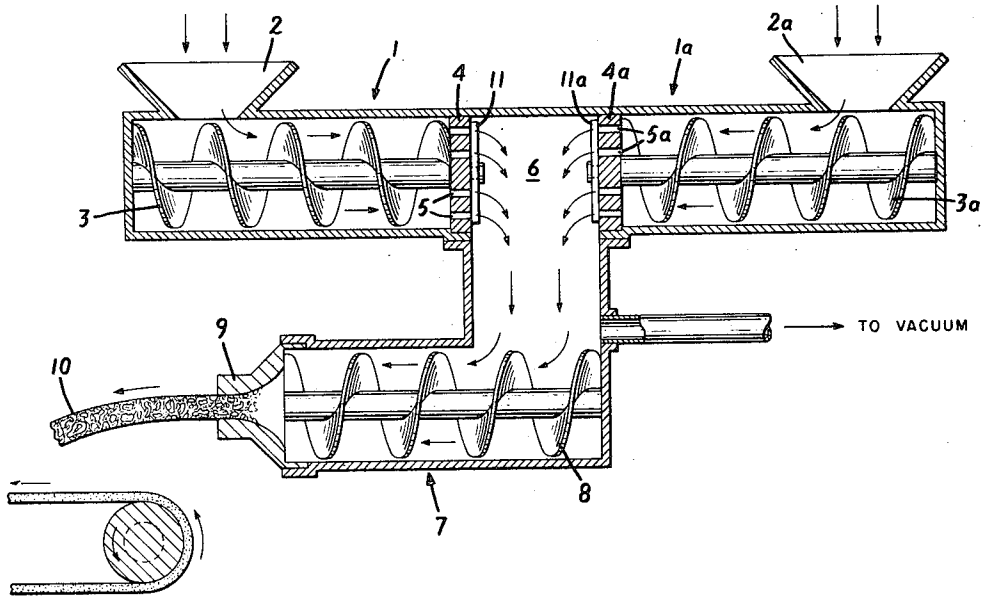
[57] **ABSTRACT**

The manufacture of marbleized toilet bars is accomplished by preparing two or more differently colored batches of soap or detergent particles, the soap or detergent compositions used all having approximately the same viscosity and plasticity. The particles range from three-sixteenths to three inches in diameter and from three-sixteenths to seven inches long. Appropriate proportions of pellets are subsequently charged into a vacuum chamber and extruded in the form of a continuous log which is cut and stamped into individual soap bars.

5 Claims, 2 Drawing Figures



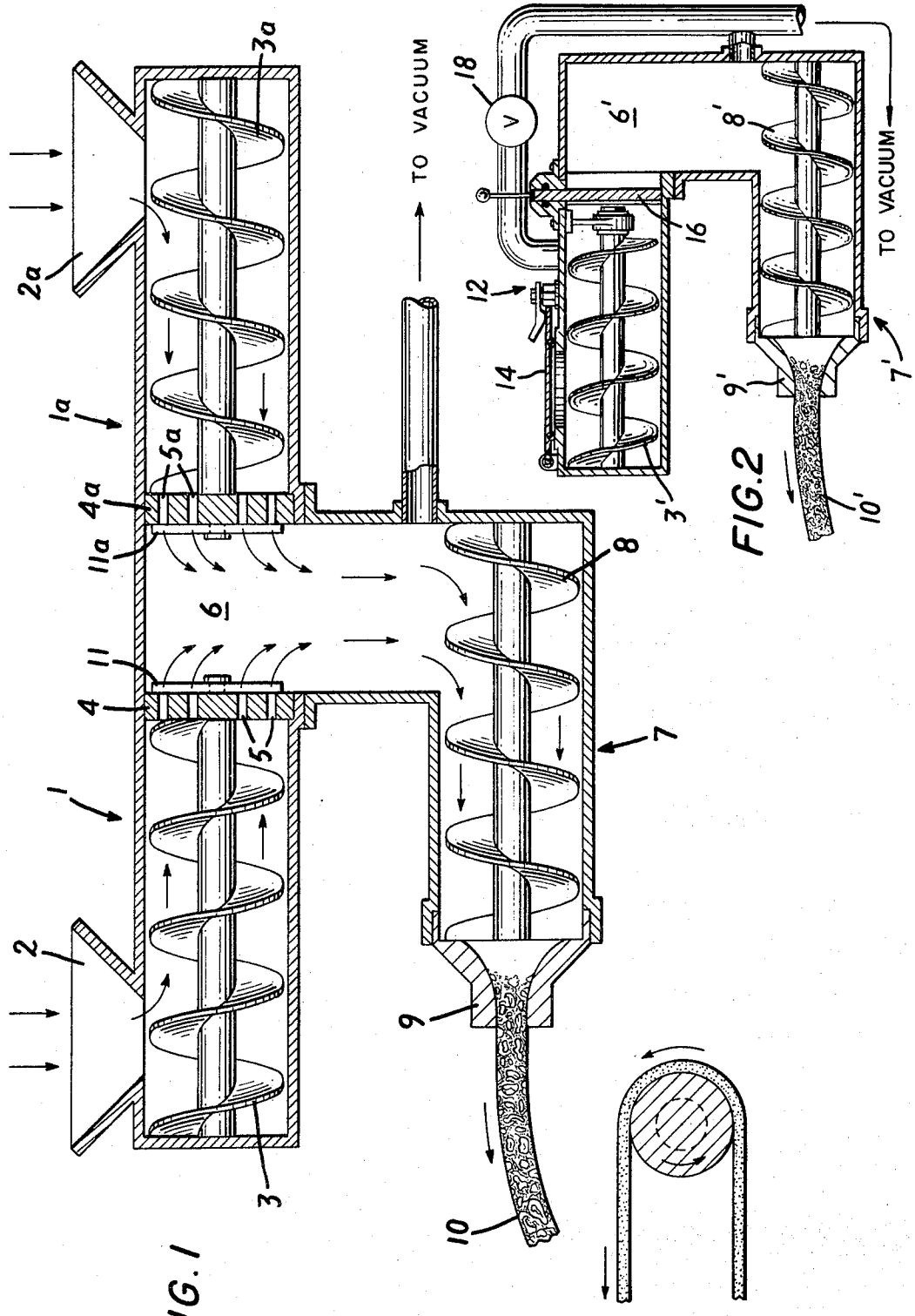


FIG. 2

FIG. 1

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METHOD FOR THE MANUFACTURE OF MARBLEIZED SOAP BARS

This invention relates to the formation of marbleized soap bars, in particular, a process for the manufacture of a soap bar with a marbleized pattern of two or more colors having a uniform density and blending of the colors throughout and free from surface irregularities. While for brevity in this specification and claims reference will be made to "soap" and "soap bars," it will be recognized that such terms are used in the sense commonly understood by consumers. Such bars are made not only from those materials chemically known as soaps, i.e., alkali metal-fatty acid salts, but also from a variety of synthetic detergents, etc.

A variety of methods for the manufacture of multi-colored soap bars has been described. Many of these methods result in products suffering from serious disadvantages, such as splitting, face cracking, etc. These difficulties are largely due to the inability to bond adequately to each other the various differently colored elements of the soap bar. Where it is attempted to extrude a multi-colored soap bar through a plodder, difficulty is experienced also in control of the color patterns due to the intense shear stresses caused by the plodder screw and die.

The present invention provides an improved process for making a milled soap bar that has a marbleized pattern of two or more colors throughout its structure. Two or more batches of distinctly different colored soap pellets, chips, or other particles having approximately the same viscosity and plasticity are fed to a chamber and are engaged by a plodder screw which compresses and blends the material and extrudes it in the form of a continuous log. The log is cut and stamped into separate, finished soap bars having a marbleized pattern.

In the process of the present invention the viscosity relationship among the various colored soap blends fed to the vacuum-plodder effects the blending of the colors in the finished soap bar and the resulting marbleized pattern. In the typical case, the viscosity is closely related to the water content of the soap materials in a given composition. It has been found that this water content among the various batches of different colored soaps must be within 4 percent of one another in order to produce the desired pattern. For example, if one of the batches has a water content of 20 percent by weight the other batch must have a water content between 16 percent and 24 percent by weight of water. The total moisture content, depending on the soap composition, will be in the range from 0 percent to 26 percent water.

The plasticity relationship among the various colored soap blends is also of prime importance with respect to producing a desired marbleized pattern. In order to ascertain this plasticity relationship between the given compositions, tests were made of the compositions with a penetrometer. A Precision Scientific Penetrometer equipped with a shaft (pin) weighing 64.7 grams and a weight weighing 454 grams, having a flat circular cross-sectional surface of 0.1838 inches in diameter was used from a height of 2.0 cm. It was found that if the penetrometer readings between the given compositions at the extrusion temperature did not vary greater than 10 mm the extruded soap bar would be of a desirable marbleized pattern.

It is also obvious that the soap used must be generally of a consistency or hardness suitable for use in a conventional plodder. For convenience this may be referred to as a "-ploddable consistency." Soap or detergent formulations useful in the present invention include all those materials and formulations recognized in the art as suitable for making plodded soap bars. Such materials include, but are not limited to:

a. Blends of coconut and tallow soaps.

b. Soaps of palm, olive, palm kernel, sesame, sunflower seed, soybean oils or various pure and combined organic fatty acid soaps.

c. Sodium fatty alcohol sulfates.

d. Alkyloxyhydroxypropane sulfonates.

e. Sodium fatty acyl taurates.

One typical soap formulation which may be employed in this process is as follows:

	white	green*	92% white 8% green	92% white 8% green without Emollients**
Sodium coconut oil soap	35.43	34.23	35.33	35.43
Sodium tallow soap	43.03	41.58	42.91	43.03
Coconut oil fatty acids	5.97	5.79	5.95	5.97
Butylated hydroxytoluene	0.04	0.04	0.04	0.04
Ethylenediamine tetraacetic acid, tetra-sodium salt	0.06	0.06	0.06	0.06
NaCl	0.77	0.74	0.77	0.77
Glycerine	0.48	0.46	0.48	0.48
3,4',5-tribromo-salicylanilide	1.50	1.45	1.50	1.50
3,4,4'-trichloro-carbanilide	0.50	0.48	0.50	0.50
Perfume	1.00	0.97	1.00	1.00
Green Dye*	—	0.37	0.03	0.03
Inert Impurities	0.13	0.13	0.13	0.13
Water	11.09	10.70	11.06	11.06
Mineral Oil	—	2.25	0.18	—
Petrolatum	—	0.75	0.06	—
	100.00	100.00	100.00	100.00

*Cosmetic Green Oxide C-61-6735 supplied by the Sun Chemical Co.
**In this example, a green soap was prepared of the same ingredients used in the green soap of column 2, and in the same proportions, however, omitting mineral oil and petrolatum as emollients.

It will be appreciated that it is common for soaps and detergents such as those described above to contain electrolytes as a contaminating by-product introduced through the usual manufacturing process. Typical electrolytes are sodium hydroxide and various sodium salts such as NaCl, Na_2SO_4, etc. For best results in this invention the electrolyte content of the soap or detergent composition used should not exceed about 5 percent.

The size of the pieces of soap which are extruded from the pre-plodder into the vacuum-plodder is also important. The pieces should have a diameter in the range of about three-sixteenths to about 3 inches and a length in the range from three-sixteenths to 7 inches. However, the length of the pellet is not critical to the invention, but rather dependent on the size of the equipment used particularly the size of the vacuum chamber. The actual sizes of the pieces to be used within this range is solely dependent on the marbleized pattern desired. For example, if a large sized pellet 3 inches in diameter and 7 inches long is mixed with a very small pellet three-sixteenths inch in diameter and 3/16 inch long there would be a very slight amount of marbleing. Furthermore, a large amount of small pellets and a small amount of large pellets or particles would produce a large multiplicity of short thin lines in the extruded log. If the reverse ratio of color were used the marble pattern might so interspaced that the portions of the log would not have any marble pattern at all.

Finally, it has been found that the proportions of colored soaps used have an effect on the type of marbleized pattern obtained, that is, the ratio by weight of the various colored soaps. If too much of any one colored soap is used the desired effect is dissipated. Accordingly, the blend of colored pellets should contain no more than 98 percent by weight of any one colored soap.

For a better understanding of the invention, reference may be made to the accompanying drawings, in which

FIG. 1 is a sectional view illustrating the manufacture of a continuous bar of marbleized soap embodying the principles of the present invention.

FIG. 2 is a sectional view of another embodiment of the invention.

In FIG. 1 only two first stage plodders are illustrated for simplicity and are numbered 1 and 1a, respectively. Both first

stage plodders have hoppers 2 and 2*a* through which the batches of milled soap chips are admitted onto compression screws 3 and 3*a*. Each batch of soap is of a different color and is prepared so as to have approximately the same viscosity and plasticity. The first stage plodders 1 and 1*a* and the vacuum-plodder 7, shown in the drawings, are of the screw type; however, a ram type extruder can also be used.

The batches of milled soap chips, one for each color desired in the final soap bar, should contain in the range from 0 to 26 percent water. However, the difference in the moisture content among the different batches of milled soap chips should not exceed 4 percent in order to obtain the desired plodding characteristic and thereby the desired pattern. If the moisture variation among the two or more batches of milled soap chips exceeds this limit, the marbleized design, would not be acceptable. The electrolyte content should also be less than 5 percent.

The composition of the soap chips may be a combination of about 5 percent to about 75 percent sodium content oil soap and about 95 percent to about 25 percent sodium tallow soap. Translucent soap can also be used to make a marbleized bar. In the harder type formulations plasticizers, such as petrolatum, mineral oil, glycerine, polyethylene glycol of molecular weight 400, and mixtures thereof, etc., may be incorporated to obtain the desired plasticity of the soap pieces. Superfatted formulas having from 0.5 to 30 percent free fatty acids could also be used. If some of the ingredients selected are too soft, they may require a hardening process in order to obtain the proper plasticity in the pieces so as to yield a soap or detergent composition having a ploddable consistency.

As stated previously the relationship between the plasticity of the different colored materials used in the process is of importance in obtaining the desired marbleized pattern. It was found that if penetrometer readings of the different colored materials being used in the process did not vary more than 10 mm at the temperature of extrusion from the vacuum-plodder, the materials would smear properly and produce an acceptable marbleized pattern.

In addition to the plasticizers being incorporated to obtain the desired plasticity of the soap pieces it has been found that if there is a different proportion of plasticizer in the different colored batches of soap there will be a variation in the amount of smearing of the different colors. The amount of variation of smearing is solely dependent on the type of marbleized configuration desired and therefore the amount of plasticizer to be added to the different colored batches of soap will be determined by this factor. However, the 10 mm penetrometer variation between the different colored batches must be maintained.

When the soap chips are dropped onto the compression screws of the first stage plodder, they are compressed and forced through pressure plates 4 and 4*a*. These pressure plates have a multiplicity of openings 5 and 5*a*, with a diameter of about three-sixteenths to 3 inches in order to allow the extrusion of pieces with a diameter of three-sixteenths to 3 inches. Rotating cutting bars 11 and 11*a* are provided to cut the extruded soap to lengths in the range of from three-sixteenths to 7 inches. It has been found that the smaller diameter pellets, e.g., below about three-sixteenths of an inch, are so thoroughly blended in plodder 7 that any marbleized appearance is destroyed since the pellets would easily homogenous and produce a product almost homegenous in color.

During the first plodding stage of the individual batches of different colored soap chips, the temperature of the extruded pellets should range between 50° to 130° F.

Following the first plodding stage, the pieces enter an evacuated chamber 6 and drop onto compression screw 8 of the vacuum-plodder. A vacuum is used at this point in the process to remove as much as possible of the air entrapped within the soap chunks in order to obtain a finished soap bar having a more dense composition.

Before the above step in the process, however, the soap pellets may be aged if desired or convenient. This aging process can run up to 16 hours in duration without adversely effecting the composition.

When the pieces of soap are dropped onto screw 8 they are compressed and blended while being transferred to the nozzle 9. During this step of the process the viscosity and plasticity of the different colored pellets, as stated previously, is of prime importance in that proper "smearing" of the colors will not take place unless the viscosity and plasticity relationship is correct, that is, the difference in the water content among the various colored soap pellets must not exceed 4 percent and the penetrometer reading between the different colored batches of soap should not exceed 10 mm.

The nozzle 9 is of conventional design and will extrude the compressed and blended chunks of soap in the formation of a continuous log. During this final compression process there will be a temperature increase in the combined soap chips in the range of 0° to 65° F.

The continuous log emerges onto a table where it is cut into individual blanks of soap in the conventional manner having a marbleized pattern with a uniform density and free from surface irregularities. The cut blanks are then stamped on a regular or capacity mold type press as is well known in the art.

It is to be noted that the above-described apparatus can be varied in a number of ways to utilize the same process. For example, one of the first stage plodders could be eliminated and the batches of different colored soap chips could all be compressed in one first stage plodder simultaneously.

Still another method for making the marbleized toilet bars it to prepare the different colored pellets in a pre-pelletizing process and then mix pellets in a plodder. More specifically, one of the first stage plodders could be eliminated from the apparatus of FIG. 1. Soap chips of one color are added to the hopper 2*a* and extruded through both stages of the plodder 1*a* and 7 to form pellets of a single color. The process is then repeated for soap chips of a different color. The different colored pellets are then mixed by adding them to the hopper 2*a* in the desired proportions, and extruded through both stages of the plodder 1*a* and 7 to form the marbleized log 10.

In this embodiment of the invention, when the two different colored pellets are processed, it is desirable that the openings in the pressure plate 4*a* be as large as possible. However, the openings in the pressure plate cannot be too large, since the pressure plate must provide an adequate seal for the evacuated chamber 6 of the vacuum plodder 7. One method which will enable using large diameter openings in the pressure plate 4a is to maintain a heel of compressed soap behind the pressure plate by designing the compression screw so that the screw flights stop approximately 1–3 inches from the pressure plates.

A fourth embodiment, as illustrated in FIG. 2, could also be used with this process. This fourth embodiment would operate on a batch type process rather than a continuous feed process as discussed with respect to the apparatus illustrated in FIG. 1. Batches of different colored soap particles are deposited into chamber 12 through opening 14. It is to be noted that in this embodiment the pressure plate 4 of the apparatus illustrated in FIG. 1 has been replaced by a valve 16 which is in a closed position when the batches of soap particles are charged into the chamber 12 in order to maintain the vacuum in chamber 6'. The valve 16 can be a butterfly valve or gate valve as would be apparent to those skilled in the art. Once all the soap particles that can be charged have been dropped into the chamber, opening 14 will be sealed and vacuum valve 18 is opened in order to apply a vacuum in the chamber. After a vacuum has been attained in the chamber, valve 16 is opened and compression screw 3' is started-up to convey the soap composition to evacuate chamber 6' through valve 16. With the soap composition in evacuated chamber 6', the process from this point forward will continue in a similar manner as discussed above with respect to the embodiment illustrated in FIG. 1. When the level of soap particles in chamber 12 approaches the

plodder screw, valves 16 and 18 will be closed and opening 14 will be unsealed allowing the chamber to be recharged and the process repeated. It is to be noted that though the charging step of the process is a batch type operation, the final extrusion of the elongated bar of soap will be a continuous process, for the charging and transfer of particles from chamber 12 to the evacuated chamber 6' will be programed so that chamber 6' will always contain a sufficient amount of soap composition to supply compression screw 8'.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

We claim:

1. An extrusion process for the manufacture of marbleized soap, comprising the steps of providing at least two batches of different colored soap particles having a diameter in the range of three-sixteenths inch to 3 inches with no more than 98 percent by weight of any one respective batch, each batch having essentially the same viscosity, the water content in each respective batch being no greater than 26 percent by weight wherein said water content in the respective batches of soap does not differ by more than 4 percent, each batch having essentially the same plasticity as measured by penetrometer readings of the respective batches of soap particles which do not differ by more than 10 millimeters at the extrusion temperature, blending said different colored batches wherein the temperature of the particles should range between 50° F. and 130° F., extruding said blended particles from a plodder through a nozzle forming a log, and thereafter cutting said log to form soap bars having a marbleized pattern of at least two different colors.

2. An extrusion process for the manufacture of marbleized soap comprising the steps of providing at least two batches of different colored soap compositions with no more than 98 percent by weight of any one respective composition, each composition having essentially the same viscosity, the water content in each respective composition being no greater than 26 percent by weight wherein said water content in the respective batches of soap does not differ by more than 4 percent, each composition having essentially the same plasticity as measured by penetrometer readings of the respective compositions which do not differ by more than 10 millimeters at the extrusion temperature, extruding each of said compositions through a first plodder having a discharge plate, thereby forming pellets of soap of the said respective colors having a diameter in the range of three-sixteenths inch to 3 inches, combining said different colored pellets in a chamber wherein the temperature of the pellets should range between 50° to 130° F., extruding said combined pellets of soap from said chamber through a second plodder having a nozzle with an orifice of suitable shape for forming a log having a marbleized pattern of at least two different colors, and thereafter cutting said log to form soap bars.

3. An extrusion process for the manufacture of soap as in claim 2 wherein the temperature of said extruded bar of marbleized soap after passing through the second plodder does not increase by more than 65° F.

4. An extrusion process for the manufacture of soap as in claim 2 wherein said pellets of soap have a length in the range of three-sixteenths of an inch to 7 inches.

5. An extrusion process for the manufacture of soap as in claim 2 wherein said chamber and said second plodder are evacuated with said discharge plate forming a vacuum seal.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,673,294 Dated June 27, 1972

Inventor(s) Raymond George Matthaei

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

[57] Abstract, lines 7 & 8, "Approprirate" should be --Appropriate--. Column 3, line 20, "content" should be --coconut--; line 65, "would easily homogenous and produce" should be --would easily mix and produce--. Column 4, line 31, "bars it" should be --bars is--.

Signed and sealed this 29th day of May 1973.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patent