

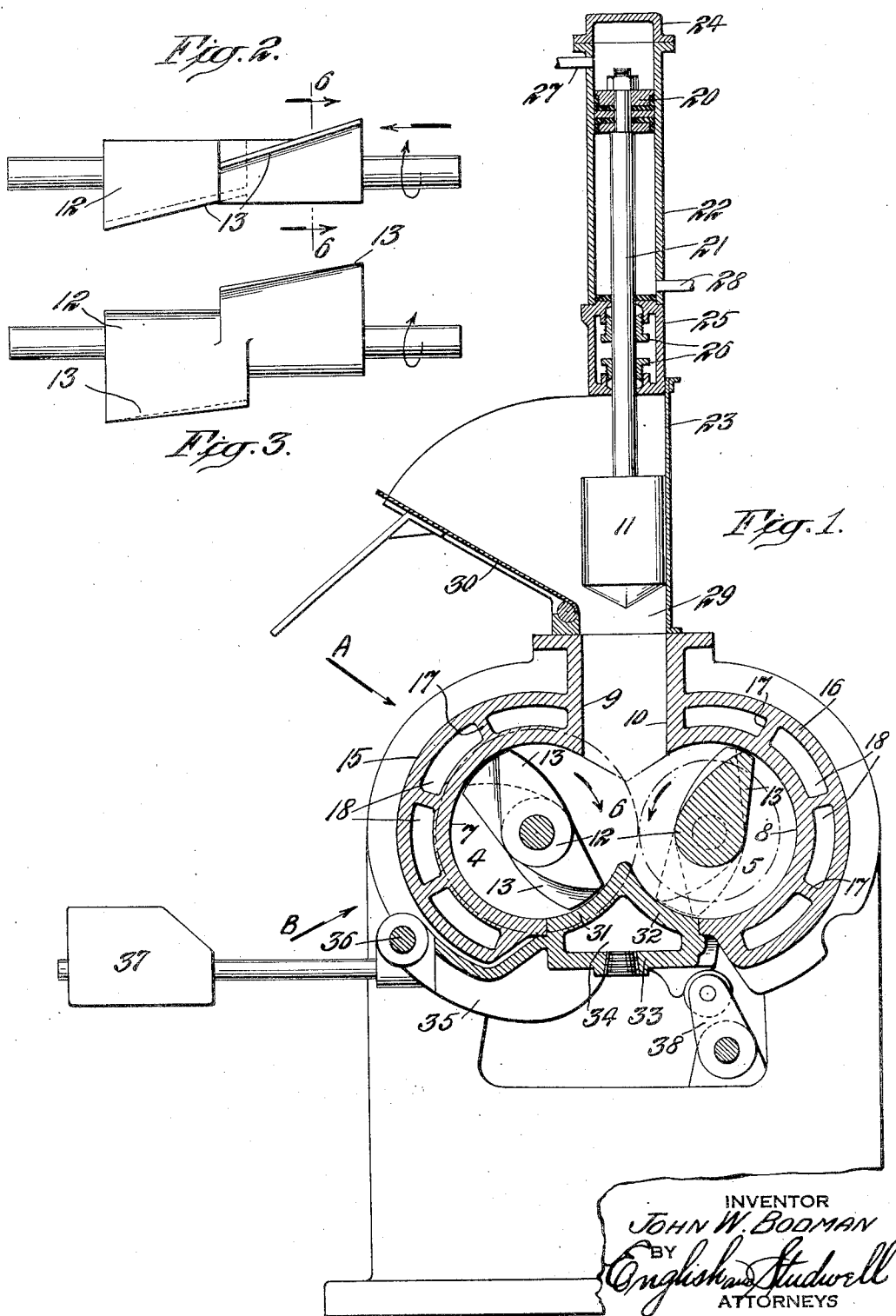
Sept. 24, 1940.

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2,215,539

SOAP AND PROCESS OF PRODUCING SAME

Original Filed April 8, 1933



UNITED STATES PATENT OFFICE

2,215,539

SOAP AND PROCESS OF PRODUCING SAME

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Continuation of application Serial No. 665,063,
April 8, 1933. This application June 18, 1936,
Serial No. 85,985

20 Claims. (Cl. 252—368)

The present application is a continuation of my application filed April 8, 1933, Serial No. 665,063.

The invention relates to an improvement in the manufacture of soap. On the one hand, the new soap may possess, but in a higher degree, the firmness and fine grain or texture of the best milled soaps; and on the other hand like some framed soaps, it is aerated. In addition to these properties of both milled and framed soaps, the new soap may possess other properties, pointed out hereinafter, and which give it a greater range of usefulness than other soaps. In solidified condition the new soap may be used in cake or bar form for toilet or other cleansing purposes; and while it is in a soft or unsolidified condition, the new soap may be used as a material to manufacture an improved comminuted or granulated soap.

The cake or bar soap in use at the present time for toilet and other purpose is either a "framed" soap or a "milled" soap, so termed according to the process by which the soap is produced.

Framed soap may be made floating or non-floating according to the weight of the added ingredients and the amount of air incorporated. The floating framed soaps, as well as the non-floating framed soaps, have a texture that is not as fine or close grained as that of soaps known as high grade or milled soaps, and although framed soaps are used in large quantities for toilet as well as laundry and other domestic purposes, they are not considered as high grade toilet soaps. Another disadvantage of framed soaps is that when the soap has cooled and solidified sufficiently for cutting into bars and cakes it contains substantially the same amount of water as kettle soap, namely, about 30%, which begins to evaporate immediately the soap is wrapped and sent to storage or put on the market. During this natural drying process, the framed soaps warp and twist, the degree of deformation depending partly on the size and shape of the bars or cakes. For the coarser uses to which framed soaps are put this is not considered a disadvantage, but it is when these soaps are used for toilet purposes. However, framed soaps can be produced relatively cheaply, and heretofore have supplied a demand which could not be met by other soaps.

Milled soaps have a solid, compact or dense structure and a fine texture, so that they do not warp as readily as framed soaps and are capable of retaining much better than the framed

soaps the perfumes which have been incorporated in them, with the result that milled soaps are more commonly the preferred form of toilet soap. The compacting of the soap masses in the milling and plodding process eliminates any air present and gives a non-floating soap. This is thought by many users of milled toilet soaps to be a disadvantage, and numerous efforts have heretofore been made to produce a floating milled soap, but so far as I am aware, none of these efforts up to the present invention, has been successful.

In milled soap there is a tendency toward disintegration, inasmuch as the bar is made up of a plurality of pellets or rods which have been pressed together and extruded continuously in the form of a long bar by the plodder. The bar-forming operation does not usually completely reform these pellets or rods into a continuous unitary mass, but rather some of them tend to retain their individual identity. This resulting segmentation tends to leave laminations or cleavage planes within the finished bar or cake of soap. It has been found that water enters the soap along the laminations or planes, which results in internal swelling tending to force apart portions of the bar with consequent rapid disintegration.

These soaps used for toilet, laundry and other domestic uses are for the most part composed of the sodium salts of oleic, lauric, palmitic and stearic acids. The kind of soaps most commonly used (at least 90 per cent or over), are composed largely of sodium oleate, sodium palmitate and sodium stearate. Varying minor amounts of other fatty acid salts such as sodium linoleate may be present. Throughout the present description but merely for the sake of illustration and simplicity of presentation, it will be assumed that the soap stock from which the new soap is made contains as its major ingredients the sodium salts of oleic, palmitic and stearic acids, which for a soap of preferred characteristics as to lathering and wearing qualities may be in substantially the following proportions: Sodium oleate 55 per cent, sodium palmitate 25 per cent and sodium stearate 20 per cent. These proportions may, however, be varied according to the kind of soap desired, a larger proportion of oleate in the soap resulting in a softer soap and a larger proportion of stearate giving a harder soap with greater wearing qualities. The soap must not of course be so hard as not to lather freely, the desideratum being a soap which lathers freely and yet does not wear away un-

desirably fast. Other fatty acid salts may be added or substituted in whole or in part for the salts above mentioned within the limits dictated by the practice in soap making. If desired, alkaline salts of derivatives of fatty alcohols having detergent qualities may be substituted for certain of the salts mentioned above, or a portion thereof.

The present invention is applicable to the treatment of soap stocks which have been prepared according to the practices obtaining in the commercial manufacture of soap for toilet and other domestic purposes. The practice of the present invention may begin at any point in the history of the soap stock after saponification, and may even be applied to the treatment of soap, considered as a finished product according to former practices, to convert the soap into an improved and different kind of soap.

The process of my invention is capable of producing an improved soap product having to a superior degree the firmness and fine texture of milled soap, but with minute air cells or bubbles uniformly distributed throughout the soap mass so as to produce a floating soap. It may also be applied to improve the water receptive and adsorptive properties of the soap by reducing them to the lowest degree compatible with free lathering.

My process may be carried out to produce a bar or cake of the new floating soap of novel structural and other characteristics more nearly resembling a milled soap than a framed soap, in that it may possess some characteristics similar to those of the finest milled soaps, such as firmness, fine grain or texture, smooth "feel" to the fingers, and ability to retain the more volatile perfumes, and does not warp on aging and drying. Unlike milled soap it floats, and furthermore may be distinguished from milled soap in having a continuous body and a uniform dispersion of fine voids throughout the mass thus resembling the freshly smoothed surface of meerschäum.

Although the soap of the present invention resembles milled soap in appearance and in some of its characteristics, it is distinctly not a "milled" soap according to the usual acceptance of that term in the trade. Milled soap is produced by compacting fragments of soap into a self-sustaining agglomerate mass while they are in a softened condition, by first passing partially dried soap chips between the rolls of the mills and then through a bar-forming plodder. The milling operation takes place at room temperature. In the plodder the soap fragments are slightly raised in temperature and softened as a result of the compacting action in forming the bar.

In producing the new aerated soap, on the contrary, the soap stock, preferably in solidified form in fragments or pellets, is reduced to a heated plastic or semi-fluid condition while it is intensely agitated or worked in the presence of air and under pressure in a chamber closed to the atmosphere. There results an aerated unitary, continuous mass of soap, as distinguished from the compacted agglomerate mass characteristic of milled soap. The intense agitation or working of the soap stock in the enclosed chamber in the present process is performed on a plasticized or semi-fluid soap stock under working pressure.

My process may be carried out to produce a very desirable improved soap which wears longer in use than either framed or milled soap, and yet which lathers freely for any purposes for which

it is used. The penetrated layer of the improved soap when left in contact with water is not as soft as the penetrated layer of milled or framed soap as heretofore produced. If left immersed in water it does not swell in the manner in which both framed and milled soaps swell when lying in water for any considerable time and when dried does not shrink. When immersed in water only a relatively thin surface layer of this new soap becomes slightly softened. This is because the water does not penetrate as far into this soap, for example, in a given period of time as it does into comparative framed and milled soaps, and because the new soap does not absorb as much water as framed and milled soaps. Furthermore, my new process imparts to the soap a texture which is continuous and unitary and free from laminations or cleavage planes extending into the body of the soap such as are formed in milled soap by compression of the pellets or pencil-like bodies from which milled soap has heretofore been made and along which water can travel and cause swelling and disintegration. As a result of these improved qualities a soap can be produced by the process of the present invention which gives off only the requisite quantity of lather when rubbed between the hands or on the wash, and which does not become noticeably or undesirably soft and slimy at its point of contact with the washstand or a flat receptacle.

It is possible that various theories may be advanced as an explanation of the unique properties or structure of the new soap and I do not intend to be limited to any such explanation herein. Nor do I wish it to be considered essential for the production of the new soap that the soap stock employed must contain palmitates, stearates and oleates as in the stock used for purposes of illustration.

In treating a soap stock according to the process of the present invention sufficient air usually enters the mixing zone with the untreated soap to impart floating properties to the soap product if the temperature and pressure conditions are maintained such as to insure that air entrapped in the soap mass will be retained therein and not permitted to escape. A floating soap produced by the present invention may have a specific gravity of from about 0.50 to about 0.98. Satisfactory floating soaps are produced at temperatures ranging from 160° F. to about 225° F., with a soap stock of the illustrative type used by way of example in this disclosure. The foregoing temperatures, of course, would be modified, depending upon the detergent components used, the moisture content and presence of other ingredients.

The pressure to which the soap mass is subjected will preferably be correlated to the temperature, the pressure being increased with the rise in temperature, and ranging from slightly over atmospheric pressure to one hundred pounds per square inch and over. Satisfactory results have, however, been obtained by maintaining a given pressure on the soap mass, say about twenty-five pounds per square inch, and varying the temperature according to the degree of the characteristic properties desired in the new soap, that is, in the rate of wear, water absorption and water penetration or resistance to water penetration. It is desirable to subject the soap mass to pressure to secure an increased working action and also to prevent escape of moisture and air from the mass. It is desirable while the soap stock is being subjected to both heat and pres-

sure, to agitate it thoroughly by mechanical means. This agitation is advantageously carried on in such manner that not only are all portions of the soap mass exposed equally to the source of heat but also all portions of the soap mass are moved relatively to each other.

The particular kind of mechanical agitation to which the soap mass is subjected is not so important as the fact that all portions of the soap mass be moved relatively to each other and be exposed equally to the source of heat. This can be done by many kinds of mechanical agitation, as for example, by a shearing and infolding action, a thorough stirring or mixing action, such as is afforded by the arms of a crutcher or the spiral blades of a Banbury mixer, or by any suitable kneading or working of the soap mass. Not only does this thorough working or agitation of the soap mass and relative movement and overlapping of all its parts relatively to each other expose them equally to the source of heat, but it also uniformly distributes any entrapped, occluded or dissolved air and gases throughout the soap mass. In floating soaps, as heretofore produced, the entrapped air bubbles are relatively large and irregularly distributed throughout the body of the soap. In the aerated or floating soap capable of being produced by the practice of the present process, on the contrary, the entrapped air bubbles are relatively smaller and are uniformly distributed throughout the body of the soap. These air bubbles or cells are so small and are so evenly distributed throughout the body of the soap that when the soap produced by the practice of the present process is cut up into cakes and bars the presence of the bubbles or air cells is not noticeable to the unaided eye and the texture of the soap is finer than that of the finest milled soaps as produced by present commercial practices.

The process of the present invention may be practiced in any suitable apparatus comprising a closed, jacketed chamber provided with agitating means, the apparatus shown in the drawing being a diagrammatic representation of a conventional type of Banbury mixer. In the drawing Fig. 1 is a vertical section of the apparatus, the right hand rotor being shown in section taken on the lines 6—6 in Fig. 2; Fig. 2 is a side elevation of one of the rotors, the view being taken in the direction of the arrow marked A in Fig. 1; and Fig. 3 is a side elevation of the same rotor, the view being taken in the direction of the arrow marked B in Fig. 1.

The apparatus illustrated in the drawing comprises two parallelly-arranged chambers 4 and 5 communicating at their inner sides which open into a central chamber 6. These three intercommunicating chambers together constitute a treating chamber in which the soap stock is subjected to heat, pressure and a thorough mixing or working over in order to convert it into a floating soap mass having the novel qualities described above. The chambers 4 and 5 are respectively formed by the cylindrical walls, indicated at 7 and 8, the upper inner ends of which terminate in the vertical walls 9 and 10 which form a mouth 14 through which the soap stock is fed into the chambers and which is adapted to be closed by a plunger 11.

The means for working over or thoroughly mixing, shearing and kneading the soap stock comprises the rotors 12 mounted axially in the chambers 4 and 5. Each of the two rotors is provided with two interrupted spiral blades 13.

The details of the shape and arrangement of the spiral blades 13 and their mode of operation are set forth in the patent to Banbury No. 1,200,070, dated October 3, 1916.

In order that the temperature of the soap mass in the treating chamber may be regulated, the walls 7 and 8 are jacketed, being provided with the shell or casing sections 15 and 16 which are separated from the walls by the ribs 17. Steam or other heating medium may be introduced into the spaces 18 defined by the walls and the casing sections.

The pressure under which the soap mass is worked may be supplied by the weight of the plunger 11 which serves to close the mouth 14 when the rotors 12 are kneading and working the soap mass in the treating chamber. If the weight of the plunger is not sufficient to exert the required pressure on the soap mass, additional pressure may be supplied by steam or compressed air acting on the upper side of a piston 20 mounted on the upper end of a rod 21 secured at its lower end to the plunger 11. The piston 20 slides in a vertical cylinder 22 supported on the upper end of a hopper 23 in turn supported on the upper ends of the walls 9 and 10. The top end of the cylinder 22 is closed by a cover 24 and the lower end of the cylinder is provided with a gland box 25 in which are located the glands 26 to prevent leakage of fluid around the piston rod 21.

The duct 27 at the upper end of the cylinder 22 admits steam or compressed air to the upper side of the piston to hold the plunger 11 down in the mouth 14 during the working of the soap mass; and the duct 28 admits steam or compressed air to the lower side of the piston to lift the plunger out of the mouth 14 on the completion of the soap treating operation. Even when no pressure is exerted on the plunger through the piston, the plunger is conveniently lifted by means of the piston.

To facilitate introducing the soap stock into the treating chamber through the mouth 14, the upper end of the latter registers with the opening 29 in the lower end of the hopper 23, the front side of which has a swinging door 30.

The treated material is discharged from the treating chamber through an opening formed in the central lower portions of the walls 7 and 8. This opening is closed by the curved wall sections 31 and 32 which form the inner lower ends of the walls 7 and 8 and which meet in a curved apex at this point. The wall sections 31 and 32 with the casing section 33 define a space which forms part of the jacket of the cylindrical chambers 4 and 5. The parts 31, 32 and 33 constitute a gate which serves to control the discharge opening of the treating chamber. For this purpose the gate is connected with an arm 35 pivoted at 36. Projecting forwardly from the arm is a counterweight 37. The gate is held in closed position by a pivoted arm 38. When the contents of the treating chamber are to be discharged, the arm 38 is swung to the right, which releases the gate and permits it to swing on its pivot 36.

The practice of the process of producing the novel soap may begin at any point in the history of the soap stock after saponification. The process may be applied equally well to settled kettle soap, or to soap made by the semi-boiling and cold-boiling processes. I set forth below for the purposes of illustration a description of the op-

eration of the process as applied to the treatment of neat kettle soap. Since, however, such soap contains about 30 per cent of moisture which would not be substantially lowered by the practice of the process, I first remove some of the water content of the soap before subjecting it to the steps of the process. This can be done in various ways, a convenient expedient being to run the kettle soap onto cooling rolls where it is chilled and solidified and from which it is scraped off in the form of shreds and ribbons and then conveyed through a drying chamber in which the moisture content of the soap is reduced to from about 5 per cent to 25 per cent, depending upon the amount of moisture desired in the finished product, the preferred range being from about 10 per cent to 25 per cent. I have produced a desirable soap having a moisture content of the order of 15 per cent. If an unscented soap is to be produced the partially dried ribbons and shreds emerging from the drier are fed directly into a plodder which discharges them in the form of pellets, the form I have found most convenient for use. If a scented soap is to be produced, the soap stock taken from the kettle can first be treated in exactly the same manner in which high grade milled toilet soaps are made today; however other suitable methods of treatment may be used in preparing the soap stock for treatment by the present process, as for example, the neat kettle soap may be reduced in moisture content without resorting to the step of solidification, by evaporating moisture therefrom while retaining it in the neat or semi-solid state.

I have set forth below an illustrative example of how a soap having desired characteristics may be produced by my process. About 150 pounds of milled soap pellets are introduced into the apparatus through the hopper 23 and the plunger or weight 11 is lowered into the mouth 14 leading into the treating chamber constituted by the chambers 4, 5 and 6. The weight of the plunger 11 plus the pressure exerted on the piston 20 will exert a pressure of about twenty-five pounds per square inch on the soap mass in the treating chamber, it being understood that various pressures may be employed depending on the character of the soap product desired. The steam or other heating medium circulating in the jacket of the treating chamber will heat the soap mass preferably to a temperature of from about 160 to about 225° F., thereby plasticizing it. The rotors 12 turn relatively slowly and preferably at different speeds, the left hand rotor, viewing Fig. 1, turning at about 34.2 revolutions per minute and the right hand rotor turning at about 13 revolutions per minute. Usually, no extra supply of air is introduced into the treating chamber beyond that which enters with the soap pellets and that which is contained or dissolved in the soap from its previous treatment, this amount of air being usually sufficient when uniformly distributed throughout the soap mass in minute cells or bubbles to produce a floating soap. However, if desired, additional air may be added.

The rotating spiral blades 13 in conjunction with the interior surfaces of the walls 7 and 8 exert a wedging action on the soap mass, and at the point where the soap contacts with the inner surfaces of the walls 7 and 8 this wedging action becomes a shearing action. As the blades move against the soap mass the latter is not only subjected to the wedging and shearing action

against the inner surfaces of the walls 7 and 8 but is also pushed axially of the blades toward the inner ends thereof which overlap somewhat, as indicated best in Fig. 3, with the result that all parts of the soap mass are constantly changing their positions and are overlapped and kneaded together. Hence all parts of the soap mass are presented to the interior surfaces of the walls 7 and 8 to receive the heat therefrom, and also whatever air is present in the soap mass is equally and uniformly distributed throughout the soap mass in microscopic cells or bubbles, by the constant and continued shifting of all portions of the soap mass.

The pressure under which the plasticized or partially melted soap mass is thus thoroughly worked and agitated apparently facilitates the process. It requires about 15 to 20 minutes to convert the soap stock in the apparatus described above. After the desirable working of the stock has been carried out to the desired degree the soap stock is released and the product cooled. The releasing preferably should take place into some form-imparting means, from which the solidified mass can be removed and cut up into cakes or bars. The cooling can take place within the form-imparting means.

Although these steps of releasing and cooling can be carried out in any preferred manner, I shall disclose a specific operation in connection with my process. For example, on the completion of the process the rotors may be shut down and the pressure on the soap mass in the treating chamber relieved, either by lifting the plunger 11 or by opening the gate. I prefer, however, to release the pressure on the chamber before opening the gate in this particular operation. The treated soap mass is discharged by throwing the arm 38 to the right and then moving the counterweight 37 upwardly, which causes the gate to swing downwardly, discharging the soap into a container. Due to the differential in temperature between that at which the operation is carried out, and room temperature, there is an immediate cooling of the discharged soap mass. If desired, there may be a preliminary cooling by passing a cooling medium through the jacket surrounding the mixer. The solidified soap mass may then be cut up into cakes and bars in much the same manner as framed or milled soap is cut up into cakes and bars. The cutting of the soap mass into cakes and bars and the pressing of the cakes and bars into the ultimate finished product does not substantially affect the specific gravity of the soap and thus the floating characteristics.

Instead of carrying out the process as a batch operation, as hereinbefore described, I may use a mixing apparatus adapted to operate continuously. Still other forms of apparatus wherein a soap mass may be thoroughly mixed while subjected to controlled heat and pressure may be employed.

When the process is practiced under super-atmospheric pressure to insure retention of air in the soap mass, the discharge of the soap mass from the mixing and converting apparatus into the atmosphere, with a consequent drop in the pressure upon the soap, will be attended by expansion of the entrapped air within the soap mass with a resulting increase in the buoyancy of the product. The specific gravity of the soap product can be controlled over a wide range by suitably adjusting the temperature and pressure conditions so as to insure the retention of the

desired proportion of air in the soap mass. A degree of aeration such that the volume of the air cells or bubbles will equal 35% or more of the volume of the soap product may be obtained.

5 The higher degrees of aeration insure a product in its soft or unsolidified condition particularly suitable for further treatment for the production of a comminuted or granulated soap. My process appears to increase the ability of the soap mass to retain air that is incorporated therewith during the mixing operation. For the first time in the art of manufacturing soap, so far as I am aware, there has been produced a floating soap which has all the qualities and properties which render milled soaps superior to framed soaps, such as fine grain or texture and the ability to retain the more volatile perfumes.

10 Subjecting the soap stock to controlled heat and pressure while working and kneading it in the presence of air converts the soap stock into a different kind of soap product. It is to be understood that by the term soap stock I mean any fully saponified soap ingredients at any stage subsequent to saponification. The detergent or cleansing properties of the soap ingredients remain substantially unaffected by the heat, pressure and agitation treatment, but when the new soap is made into bar or cake form, these properties are brought into use more economically and under better control than in the former kinds of bar and cake soap. This may be because of the continuity of the soap mass constituting the bar or cake of new soap.

15 It is a well recognized fact in the soap manufacturing industry that the cake or bar of soap offered for toilet or other domestic uses must not be undesirably soft and that it must not absorb too great a proportion of water and become so soft or slimy as to be unusable. For this reason it has been necessary heretofore to use a relatively large proportion of relatively high titre fatty acids in making up the soap composition. On the other hand, the proportion of the high titre fatty acids, that is, the palmitic, stearic, lauric acids, and the like, must not be too large, as otherwise the soap produced will be too hard and will not be sufficiently free lathering. By means of the present process which controls the hardness and the lathering qualities of the soap, it is possible to make use of a larger proportion of the salts of low titre fatty acids than has been possible according to the prior methods of soap production, and so produce a free lathering but hard soap. For example, milled toilet soaps of large demand on the market today may contain 50 per cent of oleate or linoleate. By use of the present process the percentages of the fatty acids which give the oleate and linoleate salts may be increased to substantially 75 per cent and yet the resultant soap will be harder and longer wearing than milled soap as heretofore produced.

20 The new soap may be perfumed like the present high grade and more expensive milled soaps, since the perfumes may be added to the soap stock while in the chip state or they may be added in the treating chamber. Inasmuch as the treating chamber is an enclosed container, the more volatile perfumes will not escape and therefore can be incorporated into the soap stock without substantial loss. This was not the case previously in the making of floating soaps, as perfumes added in the crutcher were in great part volatilized before the soap could be formed into bars.

25 The new soap is of a fine, homogeneous structure throughout and is almost wholly, if not en-

tirely, free from the small dried particles which are sometimes found in milled soap as heretofore produced. These small dried particles of soap embedded in the body of the bar or cake of milled soap are known as "specks," and are thought to be particles of excessively dehydrated portions of the ribbons of soap passing through the drying chamber after leaving the cooling rolls. Such specks are eliminated by the present process during the heat and pressure treatment of the soap mass in the treating chamber. In this connection it is also pointed out that the soap produced by my process has unusual smoothness and a different "feel" or texture from floating soaps previously produced. It will also be noticed that the break of a bar of my soap is different from that of soaps previously produced. This difference is apparently because of its continuous structure and formation, due to the operations carried out in the treating chamber.

30 It will also be noted that my process differs from those previously known in the art in that I am able to obtain a close and positive control of the treating conditions which I impose upon the soap mass, due to the operations which are carried out in the treating chamber. I thus avoid any variations in temperature conditions of a plant operation or of seasonal variations in humidity which have previously been trouble makers in soap production.

35 Although I have described the invention with particular reference to certain types of soaps and soap compositions, it is to be understood that the invention is not limited to the treatment of the specific types of soaps and soap compositions hereinbefore mentioned and to the products that would result from such treatment.

I claim:

1. A process for making a floating soap with a uniformly aerated continuous mass having a dispersion of fine voids throughout and having a characteristic texture and firmness similar to milled soaps and shape-stability, comprising subjecting a soap mass having a moisture content of less than about 25% to a temperature at which the mass is plastic or semi-fluid and continuous, aerating the continuous mass with a compatible gas, and forming the mass into bars or cakes.

2. A process for making a floating soap with a uniformly aerated continuous mass having a dispersion of fine voids throughout and having a characteristic texture and firmness similar to milled soaps and shape stability, comprising subjecting a soap mass having a moisture content of about 5 to 25% to a temperature of at least substantially 160° F. to form a continuous mass under pressure, aerating the continuous mass with a compatible gas and forming the mass into bars or cakes.

3. A process for making a floating soap with a uniformly aerated continuous mass and having a characteristic texture and firmness similar to milled soaps and shape-stability, comprising subjecting a soap mass having a moisture content of approximately 15% to a temperature at which the mass is plastic or semi-fluid and continuous, aerating the continuous mass under pressure with a compatible gas and forming the mass into bars or cakes.

4. A process for making a floating soap with a uniformly aerated continuous mass and having a characteristic texture and firmness similar to milled soaps and shape-stability, comprising subjecting a soap mass having a moisture content

of approximately 15% to a temperature of at least substantially 160° F. to form a continuous mass, aerating the continuous mass with a compatible gas and forming the mass into bars or cakes.

5 5. The process of producing a floating soap having a continuous aerated mass with a uniform dispersion of fine voids throughout, and a characteristic texture and firmness similar to milled
10 soaps and shape-stability, comprising introducing a soap mass containing about 5 to 25% moisture into a closed mixing chamber, working said mass in the presence of air while heating at a temperature of from about 160° F. to about 225°
15 F. to uniformly distribute air throughout said heated mass, maintaining sufficient pressure on said mass to retain the air therein, releasing said mass to cause it to solidify in a continuous and aerated state.

20 6. The process of making an improved aerated soap having a substantial dispersion of minute voids throughout a continuous mass and a characteristic texture and firmness similar to milled
25 soaps and shape-stability, which process comprises preparing a plastic or semi-fluid soap mass having a moisture content of the order of from about 5 to 25%, maintaining sufficient heat in said mass to keep it plastic or semi-fluid and continuous while disseminating a gas throughout the
30 mass in the form of minute bubbles, and forming it into bars or cakes while retaining the continuous structure.

35 7. The process of producing a floating soap having a continuous aerated mass with a uniform dispersion of fine voids throughout and a characteristic texture and firmness similar to milled soap and shape-stability, comprising introducing
40 a soap mass containing less than about 25% moisture into a closed mixing chamber, working said mass under pressure in the presence of air and while in a plastic or semi-fluid condition to uniformly distribute air throughout said mass, and forming the mass into bars or cakes.

45 8. A process for making a cast floating soap having a characteristic texture and firmness similar to milled soaps and shape-stability, comprising preparing a plastic or semi-fluid continuous soap mass having a moisture content substantially less than 25%, maintaining said mass
50 in a heated condition while disseminating a compatible gas throughout the continuous mass, and passing said heated mass without substantial pressure to a form-imparting means and cooling, whereby an aerated mass with a characteristic
55 texture, shape-stability and firmness similar to milled soaps is produced.

9. A process for making a floating soap with a uniformly aerated continuous mass having a dispersion of fine voids throughout and having a
60 characteristic texture and firmness similar to milled soaps and shape-stability, comprising subjecting a soap mass having a moisture content of less than about 25% to a temperature at which the mass is plastic or semi-fluid and continuous,
65 aerating the continuous mass under pressure with a compatible gas, and forming the mass into bars or cakes.

10. A process for producing an improved soap bar or cake having a characteristic texture and
70 firmness similar to milled soaps and having in an aerated continuous mass microscopic cells or bubbles uniformly distributed throughout the soap mass sufficient to float the soap bar or cake, comprising subjecting a soap mass having a moisture
75 content of from about 5 to 25% in the presence

of a compatible gas to intense working under pressure sufficient to increase the working action and prevent the escape of said gas from the mass, while subjecting said mass to a temperature at which the mass is plastic or semi-fluid and continuous, and forming said continuous mass into bars or cakes.

11. A floating soap, having a characteristic texture and firmness similar to milled soaps and shape-stability, said floating soap having a moisture content of less than about 25% and having a compatible gas finely disseminated through it in sufficient quantity to make it float, said floating soap resulting from the cooling of a plastic or semi-fluid soap mass containing less than about 25% of moisture through which the gas has been disseminated while the soap mass is at a temperature sufficiently high to render it at least plastic or semi-fluid.

12. A floating soap, having a characteristic texture and firmness similar to milled soaps and shape-stability, said floating soap having a moisture content of less than about 25% and having a compatible gas finely disseminated through it in sufficient quantity to make it float, said floating soap resulting from the cooling of a plastic or semi-fluid soap mass containing less than about 25% of moisture through which the gas has been disseminated under pressure while the soap mass is at a temperature not lower than about 160° F.

13. A floating soap, having a characteristic texture and firmness similar to milled soaps and shape-stability, said floating soap having a moisture content of less than about 25% and having a compatible gas finely disseminated through it in sufficient quantity to make it float, said floating soap resulting from the cooling of a plastic or semi-fluid soap mass containing less than about 25% of moisture subjected, in the presence of the gas, and under pressure, to mechanical agitation to disseminate under pressure the gas through the mass at a temperature sufficiently high to render it at least plastic or semi-fluid.

14. A floating soap, having a characteristic texture and firmness similar to the milled soaps and shape-stability, said floating soap having a moisture content of about 15% and having a compatible gas finely disseminated through it in sufficient quantity to make it float, said floating soap resulting from the cooling of a plastic or semi-fluid soap mass containing about 15% of moisture through which the gas has been disseminated while the soap mass is at a temperature sufficiently high to render it at least plastic or semi-fluid.

15. A bar of uniformly and finely aerated soap having a continuous mass form and having a characteristic texture and firmness similar to milled soaps and shape-stability, said bar resulting from disseminating a material proportion of a compatible gas in a soap mass having a moisture content of from about 5 to 25%, while maintaining said mass in a plastic or semi-fluid condition with heat, and forming said mass into bars or cakes.

16. A bar of uniformly and finely aerated soap having a continuous mass form and a characteristic texture and firmness similar to milled soaps and shape-stability, said bar resulting from disseminating under pressure a material proportion of a compatible gas in a soap mass having a moisture content of about 15%, while subjecting said mass to a temperature of at least about 160° F., and forming said mass into bars or cakes.

17. A bar of floating soap cast from a soap mass

of relatively low moisture content, having an aerated continuous structure and a characteristic texture and firmness similar to milled soaps and shape-stability, said soap while in a plastic or semi-fluid continuous state and with a moisture content of less than 25% having had a compatible gas dispersed throughout the mass and having then been passed without substantial modifying pressure or working to a form-imparting means and cooled while retaining the dispersed gas throughout the continuous mass.

18. A floating soap having a characteristic texture and firmness similar to milled soaps and shape-stability, said floating soap having a moisture content of less than about 25%, and having a compatible gas finely disseminated through it in sufficient quantity to make it float, said floating soap resulting from the cooling of a plastic or semi-fluid soap mass containing less than about 25% of moisture through which the gas has been disseminated, while the soap mass is under pressure and at a temperature sufficiently high so that it is plastic or semi-fluid.

19. A bar or cake of floating soap having a characteristic texture and firmness similar to milled soaps and having microscopic cells or

bubbles uniformly distributed throughout the soap mass, resulting from the disseminating of a material proportion of a compatible gas in a soap mass, having a moisture content of from about 5 to 25%, while subjecting said mass to a temperature at which the mass is plastic or semi-fluid and continuous, and while intensely working said mass under pressure sufficient to increase the working action and prevent the escape of said gas from said mass, and forming said continuous mass into bars or cakes.

20. A floating soap having a uniform dispersion of fine voids throughout its mass, and a characteristic texture and firmness similar to milled soaps and shape-stability, with a moisture content of less than about twenty-five percent, said floating soap resulting from working in a closed mixing chamber a continuous soap mass containing about 5 to 25% moisture in the presence of a compatible gas under pressure, while the mass is heated to a temperature of from about 160° F. to about 225° F., and then releasing the mass to cause it to solidify in a continuous and aerated state.

JOHN W. BODMAN.

CERTIFICATE OF CORRECTION.

Patent No. 2,215,539.

September 24, 1940.

JOHN W. BODMAN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 5, first column, line 54, for "illed" read --milled--; page 6, second column, line 41, claim 13, strike out the words "under pressure"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 19th day of November, A. D. 1940.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.

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