C. ELLIS.

SOAP AND PROCESS OF MAKING SOAP.

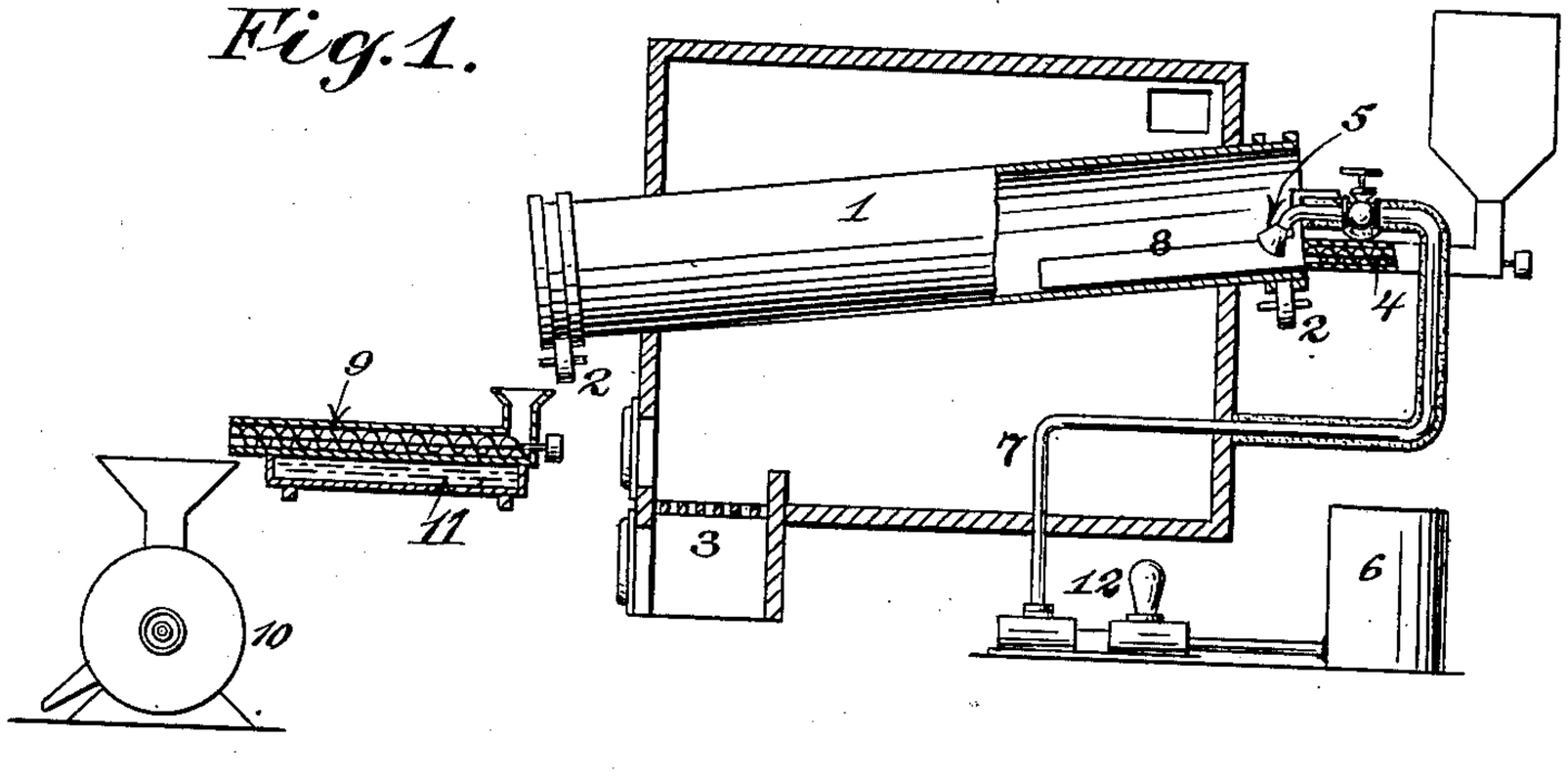
APPLICATION FILED NOV. 9, 1907.

904,520.

Patented Nov. 24, 1908.

2 SHEETS—SHEET 1.

Fig. 1.



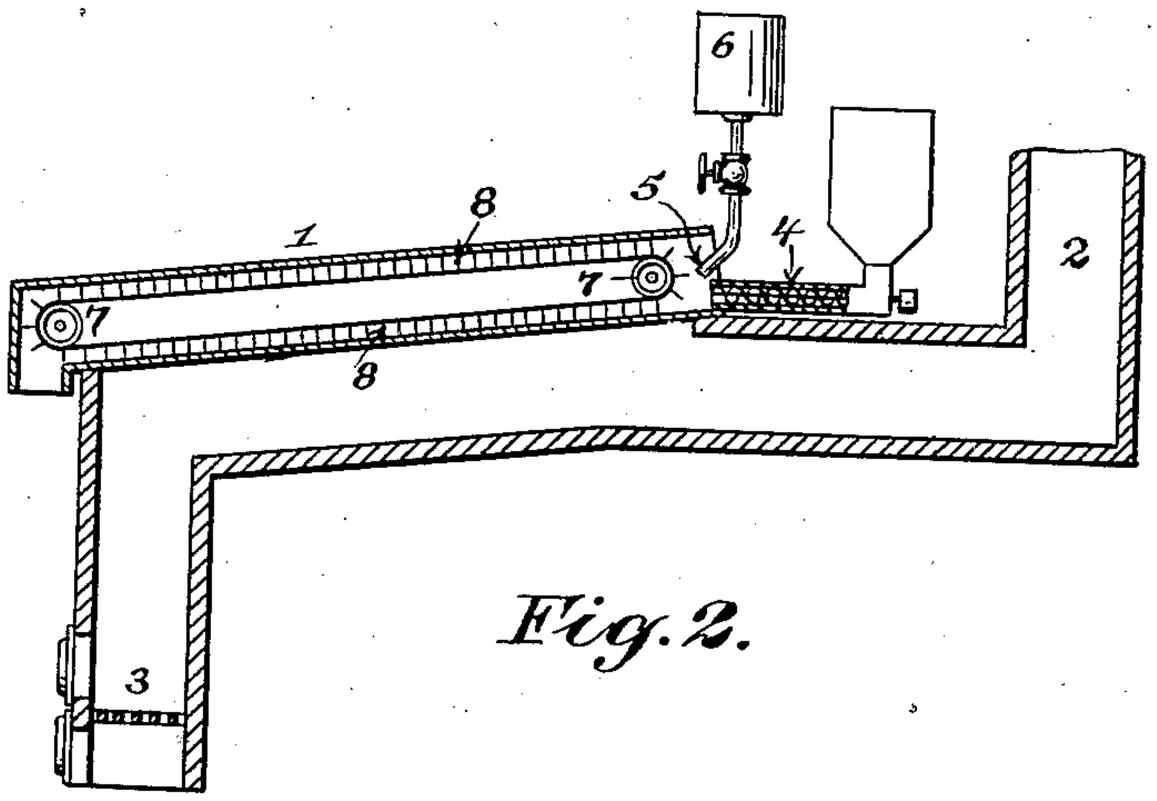


Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

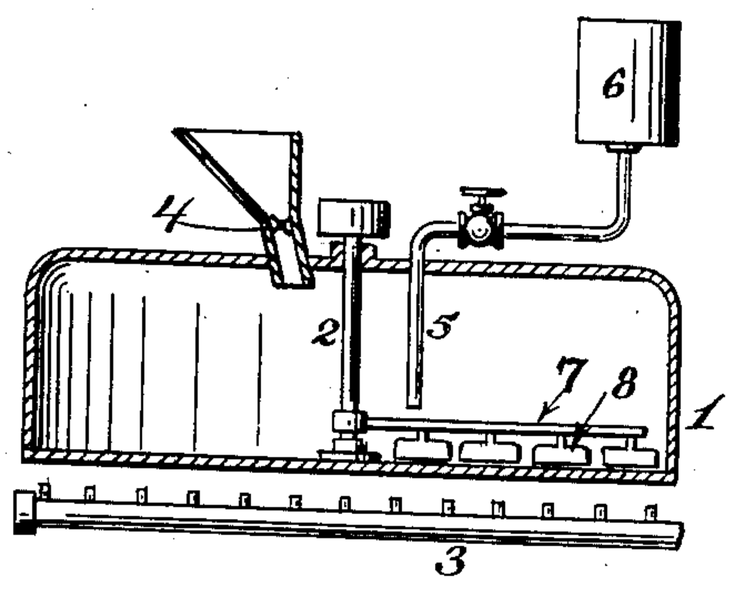
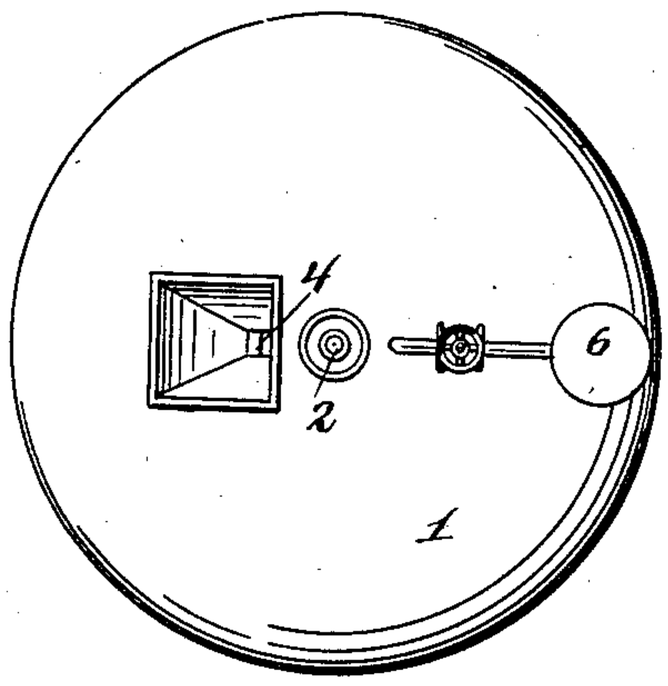


Fig. 4.



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UNITED STATES PATENT OFFICE.

CARLETON ELLIS, OF LARCHMONT, NEW YORK, ASSIGNOR TO ELLIS-FOSTER COMPANY, A CORPORATION OF NEW JERSEY.

SOAP AND PROCESS OF MAKING SOAP.

No. 904,520. Specification of Letters Patent. Patented Nov. 24, 1908.

Application filed November 9, 1907. Serial No. 401,516.

To all whom it may concern:

Be it known that I, CARLETON ELLIS, a citizen of the United States, residing at Larchmont, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Soap and Processes of Making Soap, of which the following is a specification.

This invention relates to the process of making soap powders or soap material, preferably in the powder form, and to certain novel products resulting from said process, and relates particularly to the production of anhydrous, or substantially anhydrous, soap powders, or saponaceous matter, all as more fully hereinafter described; particular points of novelty being set forth in the appended claims.

The present methods of manufacturing soap and soap powders involve the protracted and costly method of saponifying the grease or soap stock with alkaline solutions, salting out the soap, crutching and setting in frames, and subsequently slicing, drying, reducing to a granular condition, redrying and grinding to a powder, and mixing with soda ash or other detergent or filling materials.

My invention involves the manufacture of soap powders and similar soap material, without the use of aqueous solutions for the purpose of saponification, and consists essentially in the treatment of the soap stock with the alkali at temperatures sufficiently high to cause the direct combination of these two elements of the soap. In this manner products are produced which are entirely free from water and consist substantially of the alkali in combination with the fatty acid of the soap stock employed, and more especially in a peculiar amorphous condition, physically differing from the soap material produced by the saponification of soap stock with aqueous solutions of the same alkalies.

The soap stock which I preferably employ in preparation of my improved composition, is oleic acid, or red oil, or similar free fatty acids, such as stearic acid and palmitic acid, as well as such resinous bodies as colophonium. The particular advantage residing in the use of these materials is that on combination with the alkali, no glycerin is set free to confer upon the product deleterious hydroscopic properties.

The process may be carried out in the following manner, which represents the preferred form of the invention as I now produce it, and will serve as an illustration of the manner in which useful soap products may be made, all as will henceforth be fully apparent to those skilled in the art to which this invention appertains. In a suitable receptacle, such as a kettle, which may be heated by an oil bath or by direct heat, and fitted with suitable stirring apparatus, I place a charge of 500 pounds of soda ash. This material is heated to about 250° Fhr. and commercial oleic acid run into the kettle upon the soda ash while the latter is being stirred, until 300 pounds of the oleic acid have been added. I preferably introduce the latter by means of an atomizer or sprayer so that uniform distribution of the oleic acid through the soda ash is effected. The mixture is then heated for a suitable time, ordinarily for from fifteen to thirty minutes with continuous stirring until the oleic acid has combined with its equivalent of soda ash, and has in this manner formed a dry anhydrous soapy material. The batch may then be cooled somewhat and passed through grinding rolls, and if desired, screened to produce a powder of suitable uniformity. It is then ready for the market, but if desired, may be mixed with other detergent material such as borax and the like, or fillers such as sodium sulfate; or if the powder is to be used for polishing purposes, polishing or abrading material such as tripoli, ground pumice stone, silex or rotten stone, and the like, may be introduced.

The process above described conducts the operation of manufacture in an intermittent manner, and I preferably, in working on a large scale, manufacture the product in a novel way, which involves the production of the anhydrous soap powder in a continuous manner. To this end I feed the soda ash and reacting soap stock, such as the commercial oleic acid aforesaid, in a continuous manner into an apparatus such as a rotary inclined heating chamber fitted with scrapers, and pass the material through said inclined chamber, applying suitable heat thereto, and delivering the material in the form of an anhydrous soap, at the lower end of the rotary chamber.

In the accompanying drawings, Figure 1 shows partly in elevation and partly in section, a rotary inclined treating chamber.

Fig. 2 shows a stationary inclined treating chamber in section. Fig. 3 is a section of circular heating table. While Fig. 4 shows the same apparatus in plan view. All of these drawings are diagrammatic.

By referring to the accompanying drawings, it will be seen in what manner this preferred form of operation is carried out.

In Fig. 1, 1— represents a rotary receptacle mounted on the roller bearings —2, and heated by the furnace —3; the rotary chamber is inclined, and at its upper end is introduced the soda ash through the conveyer —4, while the fatty acid is introduced through the sprayer —5, in order to put the fatty acid material in a form suitable for rapid reaction, the acid material is placed in the supply tank —6, and by means of the pump —12, passes through the heating tube —7, prior to its discharge from the spraying element. The scrapers —8 prevent the adhesion to the rotary chamber walls of any material portion of the composition. The product discharging from the lower end of the rotary chamber is carried by the conveyer —9 to the grinder —10, and discharges therefrom in shape ready for packing in containers. To facilitate the operation of grinding, the conveyer —9 is preferably equipped with the cooling jacket —11, through which cold water circulates.

In Fig. 2, 1— represents an inclined stationary chamber having the furnace —3 and stack —2; 4— is a conveyer for feeding soda ash or other alkali into the chamber —1; 5— is a nozzle connected by piping to the tank —6 and used to distribute the oil soap stock upon the soda ash; 7— represents a driving pulley on which is strung the scrapers —8.

In Figs. 3 and 4, 1— represents a flat table in the center of which is situated the driving shaft —2 vertically mounted; 3— is a series of Bunsen burners, heating the table from the lower side; 4— is a feeding device for introducing alkali near the center of the table; 5— is a pipe through which the soap stock heated if desired, is introduced; 6— is a soap stock supply tank; 7— is a radial arm to which are attached the scrapers —8. The product so produced is of a friable character, differing from soap materials prepared in the wet way from which water has been removed by drying, and this peculiar friable condition of my product makes the operation of grinding relatively simple, while conferring peculiar detergent properties upon the material.

Heating of the rotary chamber may be effected, as described, by means of the furnace, but it should be borne in mind that care must be taken to prevent overheating the product as it passes through the chamber; too high a heat gives rise to a product having the disagreeable odor of burned fat, and I preferably conduct the preparation at a maximum temperature of 250° Fhr., although for certain fatty material it is possible to work at a higher temperature without material decomposition. Instead of applying heat to the exterior by means of a furnace, there may be introduced into the rotary chamber at the lower end, aforesaid, gases derived from the passage of air, or inert gases, through a suitable preheating device. Where direct heat is used, the furnace should not be placed too close to the rotary chamber so that direct contact of the flame may be avoided. The heating operation is under better control if the heated products of combustion only come in contact with the rotary chamber. As specified above, a suitable composition is derived by heating in this manner some 300 parts of commercial oleic acid with some 500 parts of soda ash, forming sodium oleate. It is possible to make use of other alkalies such as caustic soda, caustic potash, potassium carbonate, or even the bicarbonates of these bases. Twenty parts of stearic acid combined with 50 parts of soda ash make a suitable soap powder basis. Where a large excess of soda ash is desired, the proportion of fatty acid may be reduced, as for instance, 15 parts of commercial oleic acid may be combined by my process with 50 parts of soda ash. A fairly cheap composition may be made by melting 15 parts of resin with 15 parts of red oil, and mixing it, while it is in the liquid state due to heating, with 50 parts of soda ash, in the manner above set forth.

For textile work it is sometimes desirable to have a considerable proportion of potash present in the soap powder, and a suitable composition containing anhydrous potash soap is made by heating in a similar manner 25 parts of potash, 25 parts of soda ash, 10 parts of resin, 10 parts of red oil and 10 parts of a fatty soap stock consisting largely of free fatty acids, with but a small proportion of glycerides. The product prepared in accordance with any one of these formulas may be mixed with from 10 to 50% or more of borax or Glauber's salts, or similar detergent or filling material. For an abrasive or polishing mixture, the addition of from 10 to 20% of silex or ground pumice generally suffices. Perfuming agents such as safrol, oil of mirbane and the like may be added if desired. The soap powder prepared in this manner may also be worked into the form of cakes by suitable compression, which operation is facilitated if the soap powder is first rendered slightly moist by sprinkling with water or alcohol, or by the addition of water or alcohol to the soap powder in a suitable mixer. In the manufacture of the material into solid cakes, it is generally advisable to use the maxium amount of soap stock in order that the composition may not be too strongly alkaline. In combining and com-

pressing into cakes in this fashion, one may intermingle or incorporate hydrocarbon material, such as naphtha or kerosene, if desired, or ammonia as carbonate or sulfate of ammonia may be added.

By my process, using the dry method to effect combination of the soap elements, the great cost and expense of the extensive plants required for the production of soap, is eliminated, and a new product is produced existing rather more in an amorphous form than in the crystalline or semi crystalline condition in which said ordinary wet process soap exists.

To recapitulate: My process consists in the treatment of soap stock, and more particularly free fatty acids of ordinary fats, with a suitable amount of an alkali base, the latter being preferably in excess, and preferably being in the form of the carbonate or hydroxid, such as the carbonates or hydroxids of sodium or potassium, and in subjecting the mixture to a temperature sufficient to cause the complete, or substantially complete, combination of the soap stock and the alkali base to form a dry substantially anhydrous friable soap material, capable of being rapidly ground to a fine product, and further comprises the novel method of manufacture of said material, comprising the treatment of the raw material in a continuous manner to produce soap by a continuous or non-cumulative method. It further comprises as a new article of manufacture the product derived from said process, namely friable substantially anhydrous and normally amorphous water soluble soap produced by the direct combination of soap stock, such as fatty acid material with bases producing water soluble soaps, such as the carbonates of sodium or potassium.

Having described my invention, to the details of which, I, of course, do not wish to be limited, what I claim is:

1. The process of making anhydrous soap powder of a water soluble character, which consists in intimately mingling in a continuous manner a powdered alkali material with a soap forming a fatty acid, in heating the mixture to the reacting temperature at which said alkali and acid material combine, in continuously stirring the reacting mass, until combination is substantially complete, and in cooling and grinding the resulting product.

2. The process of making a substantially anhydrous soap material, which consists in intimately mingling in a continuous manner a fixed alkali such as soda ash with fatty acid material such as commercial oleic acid, and in agitating and heating the mixture until substantially the greater portion of the oleic acid is converted into sodium oleate; whereby a friable substantially anhydrous soap material is produced.

3. The process of making anhydrous soap powder, which consists in combining soap stock comprising a substantial proportion of free fatty acid with a fixed alkali without the addition of water, and at a temperature in the neighborhood of 250° Fhr.; said process being conducted in a continuous and non-cumulative manner.

4. The process of producing soap which comprises the intimate admixture in a continuous manner of powdered fixed alkali, such as soda ash with soap stock, comprising a substantial proportion of free fatty acid, the fixed alkali being present in excess of the soap stock material; and in subjecting the mixture to dry heat at an elevated temperature; whereby combination between the fixed alkali and the soap stock is rendered substantially complete.

5. The process of manufacturing a soap powder, which consists in spraying upon a mixture of about 500 parts of soda ash, approximately 300 parts of commercial oleic acid, in simultaneously stirring and heating the mixture to a temperature of about 250° Fhr., and in cooling and grinding the resultant friable product.

In testimony whereof I have affixed my signature in presence of two witnesses.

CARLETON ELLIS.

Witnesses:

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HENRIETTA BERKWITZ.