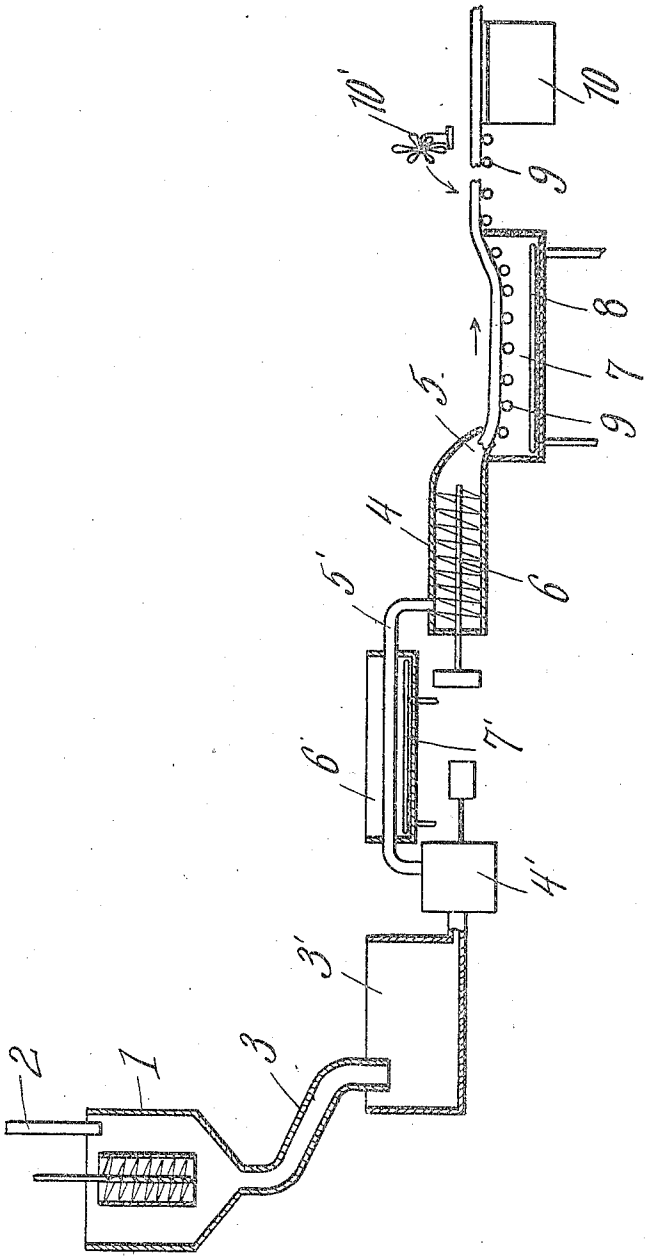
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METHOD OF SOLIDIFYING SOAP.

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1,164,397. Patented Dec. 14, 1915.



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METHOD OF SOLIDIFYING SOAP.

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To all whom it may concern:

Be it known that I, WILLIAM D. RICHARDSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Methods of Solidifying Soap, of which the following is a specification.

My invention relates to improvements in processes of solidifying normally solid materials or compositions, particularly fats or fatty esters, including soap, oleomargarin and the like, to form the same into cakes or bars.

As is well known, in the manufacture of soap, after the liquid or plastic soap has settled in the kettle, it is withdrawn therefrom and fed into a crutcher, wherein it is agitated and mixed with other ingredients, such as sodium carbonate, borax, sodium silicate, or the like. After this treatment the molten or more or less plastic soap is removed from the crutcher and introduced into a frame, or mold having removable sides. In this frame, the molten or more or less plastic soap is allowed to cool and solidify and after becoming sufficiently solid, the sides of the frame are removed and the large piece of solid soap is removed and cut into slabs, which are in turn cut in to bars or cakes. These bars or cakes are subsequently dried and stamped. This old process of cooling, solidifying and cutting the solid soap into bars or cakes is time consuming, expensive, and possesses numerous disadvantages. There is considerable waste of soap in cutting the frame of soap into the bars or cakes, and this waste soap is reboiled or remelted, and again put into frames to solidify. It has been found that by introducing the liquid or plastic soap into the frames for cooling, air holes are not infrequently formed in the slabs of soap, which are apparent when the slabs are cut into the bars or cakes. When it is found that the solidified soap contains air holes, it must be remelted and again placed in the frame. The process of gradually cooling the soap by allowing the same to stand in the frames is disadvantageous, as the space occupied by the frames is considerable, and in hot weather with consequent slow cooling, segregation occurs in the frames. My method is believed to overcome these disadvantages. In accordance with my method, I take more or less liquid or plastic soap from the kettle and preferably introduce the same into the crutcher in the usual manner, wherein it is agitated and mixed with the desired ingredients. From the crutcher the soap is fed into a receiving tank and then either with or without preliminary cooling, the soap ordinarily being molten or in more or lass plastic condition, is fed into a pipe cylinder or shell having a reduced outlet orifice of the proper cross sectional area and shape depending upon the cross sectional area and shape of the cake or bars of soap which it is desired to form. Within this cylinder or shell the more or less fluid or plastic soap is subjected to pressure which causes the soap to pass out of the contracted orifice or opening and into a cooling liquid, preferably salt water or brine, preferably maintained at a temperature between 30° and 60° F., while other liquids may be employed with some degree of success and the temperature of the liquid may be varied within wide limits without departing from the spirit of the invention. It is advantageous that the liquid should have a relatively low temperature so that it will suddenly chill and harden the soap, causing it to become solid whereby the bars or cakes thereof will retain their original shape. The chilled liquid preferably has a specific gravity greater than soap, so that the latter will float thereon but liquids of lower specific gravity may also be used.

Instead of employing salt water or brine as a chilling liquid, I may employ vegetable or animal oil, mineral oil, water or solutions of various other salts such as sodium carbonate, borax, sodium silicate, etc.

The soap is allowed to remain within the chilling liquid or medium for a sufficient length of time so that it is hard enough to be handled without being deformed. In order to complete the cooling I preferably allow the soap after it leaves the cold fluid to be conveyed for a distance through air, directing fans upon it in order to effect chilling and drying to better advantage. The preliminary cooling I effect in various ways, as by water or brine cooled cylinders or rolls such as are used for chilling toilet soap in drying machines, or lard, oleomargarin and other fats, or by water jackets on the pipes or plodder through which the molten or semiliquid soap is forced on its way to the principal cooling device consisting of the orifice and cold fluid. The soap is preferably continuously discharged in the

chilling liquid, and propelled thereon to a point where it is cut without perceptibly retarding its travel.

In the accompanying drawing forming a part of this specification and in which apparatus suitable for the practice of my process is shown, the figure is a central vertical longitudinal sectional view through apparatus embodying my invention.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 1 designates a crutcher of any well known or preferred type. The fluid or plastic soap, with or without preliminary cooling, is fed into the crutcher 1 through a pipe 2, and while within the crutcher is agitated and mixed with suitable ingredients such as soda, borax, or the like. The heated or more or less plastic soap passes preferably by gravity from the crutcher through a pipe 3 and enters a receiving tank 3'. The soap is then withdrawn from the receiving tank by a pump 4' and fed through a pipe 5' into one end of a compression cylinder or shell 4. The pipe 5' is preferably surrounded by a cooling shell or jacket 6', adapted to contain water or brine, which is cooled by refrigerating pipes 7'. The function of this cooling jacket is to give the more or less plastic soap a preliminary cooling before entering the compression cylinder or shell 4, and it is to be understood that some degree of success in the practice of the process is obtainable by omitting this preliminary cooling. The entrance end of the cylinder or shell 4 is closed except for connection with the pipe 5' and its opposite end is provided with a reduced discharge orifice or conduit 5, having any desired shape in cross-section and any suitable area, depending upon the shape and size in cross-section of the cake or bar of soap to be formed. Arranged within the cylinder or shell 4 is a spiral conveyer 6, serving to compress the more or less plastic soap and cause the same to be discharged through the reduced orifice or conduit 5. Any other suitable means may be employed to thus compress the soap, such as a plunger or the like, or the pressure exerted by the pump alone may be sufficient, in certain instances.

The outlet conduit 5 compresses the soap to prevent the formation of air openings therein and discharges into a cooling shell 7, partly or wholly filled with a cooling liquid or medium, preferably salt water or brine, as shown. The brine is sufficiently strong to prevent any substantial dissolving of the soap therein. The temperature of the brine is preferably maintained between 30° and 60° F., by refrigerating pipes 8 arranged in the lower portion of the shell 7, while any other refrigerating means may be employed. Upon the passage of the soap into the brine it is suddenly chilled upon contact with the cold liquid and becomes more or less solid. The soap is preferably continuously fed from the outlet conduit 5 and forms a long strip or bar, engaging upon propelling rollers 9, which are rotated in the direction of the arrow. These rollers propel or effect the longitudinal travel of the strip of soap to a table 10, whereon it is cut into cakes or bars of suitable sizes, preferably without perceptibly retarding the longitudinal movement thereof. There is a considerable space between the shell 7 and table 10, and the soap while traveling through this space is preferably subjected to the action of a current of air from a fan 10', which serves to evaporate the salt water adhering to the soap whereby the soap is dried.

It is thus obvious that my method besides being much more expeditious than the old methods, may be practised by means of apparatus which will take up very little space as compared to prior apparatuses for the same purpose. The single receptacle 7 will cool a large number of cakes or bars in a given time, and a larger number than could be accomplished by the means of a plurality of the ordinary frames now in use.

While I have illustrated my method in the chilling and hardening of soap, it is to be understood that the invention is not restricted to the treatment of soap alone but is intended to include the treatment of normally solid materials or compositions, particularly fats or fatty acid esters, including soap, oleomargarin or the like.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same, and that various changes may be made therein without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described the invention, I claim:—

1. The herein described method of forming normally solid material into cakes or bars, which consists in forcing the material while in a more or less plastic state and under suitable pressure through an orifice and introducing it into a cold fluid adapted to suddenly chill the material and render it solid before the same loses its shape.

2. The herein described method of forming normally solid material into cakes or bars, which consists in applying suitable pressure to the material while in a more or less plastic state for forcing the same through a contracted orifice to prevent the formation of air openings therein, and introducing the material after passing through the orifice into a cold fluid to suddenly chill it.

3. The herein described method of form-

ing normally solid material into cakes or bars, which consists in applying suitable pressure to the material while in a more or less plastic state for forcing the same through a contracted orifice, introducing the material after passing through the orifice into a cold fluid to suddenly chill it, and removing the chilled material from the presence of the cold fluid.

4. The herein described method of forming normally solid material into cakes or bars, which consists in feeding the material through a shaping conduit while in a more or less plastic state, introducing the material after passing through the conduit into a cold liquid having a greater specific gravity than the material to suddenly chill it, and removing the chilled material from the presence of the cold liquid.

5. The herein described method of forming soap into bars or cakes, which consists in passing the soap in a more or less plastic condition through a shaping conduit into a cold liquid to suddenly chill the soap, and removing the chilled soap from the cold liquid.

6. The herein described method of forming normally solid fatty acid esters into cakes or bars, which consists in passing the fatty acid esters in a more less plastic condition through a shaping conduit into a cold liquid to suddenly chill the same, removing the fatty acid esters from the presence of the cold liquid, and subjecting the same to the action of a current of air to dry it.

7. The herein described method of forming normally solid material containing fatty acid esters into cakes or bars, which consists in forcing the material while in a more or less plastic condition through a shaping conduit into a cold liquid to suddenly chill the material, supporting and propelling the chilled material through the cold liquid to a point exteriorly of the liquid, subjecting the material exteriorly of the liquid to the action of a current of air, and cutting the material thus treated into sections of suitable size.

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

WILLIAM D. RICHARDSON.

Witnesses:

GENEVIEVE RICHARDSON,

FLORA J. RICHARDSON.