Non-transparent soaps will solidify from the hot fluid state to a crystal conglomerate, which contains more or less soap in colloidal dispersed state. Transparent soaps as usually made are solid, under-cooled solutions to which alcohol, glycerine, sugar, crystal soda or similar substances have been added in order to prevent a crystallization of the mass during the solidification. Pillar transparent soaps when produced in this manner, are allowed to cool slowly and, after proper drying are formed by means of a press into bodies of suitable form and size. Soaps of this kind contain only about 40% of fatty acid, are more or less strongly alkaline and are rapidly used up. On account of their high content of alkali and crystal soda they also irritate the skin. Moreover, these soaps must be stored for a long time before they are put upon the market and, on account of the filler substances contained therein, are very uneconomical in use. Such soaps are also disproportionately expensive and this drawback is chiefly due to the inevitable losses of alcohol which occur during their production.

It is also possible to produce a high percent transparent soap without the use of filler and containing about 73-75% fatty acid, but even in this case it is necessary to use large quantities of alcohol, which subsequently must be distilled off whereby losses are inevitable. The obtained soap must be stored for a long time, usually for several months, whereby the costs of manufacture of course are considerably increased.

After thorough and prolonged investigations, I have now succeeded in developing a process by means of which a clear high percent kneaded transparent soap, viz: a transparent soap containing a high percentage of saponified fatty acids, may be obtained without filler substances. The novel process consists essentially in saponifying a suitably thoroughly pre-purified batch of fatty matter with pre-purified alkalies in the presence of saponifiable natural resin in amounts sufficient to retard the crystallization. Preferably neither electrolytes nor the usual additions of glycerine, alcohol, sugar, crystal soda or the like are used. The hot fluid soap is thereupon, while in the form of a thin layer, suddenly cooled to room temperature and, if necessary, dried in the air. When drying, however, care must be taken to avoid super-saturation. The glass-clear soap obtained is kneaded and, if desired, mixed with scent and other additional substances by means of cold rollers in a suitable kneading or mixing apparatus, and is thereupon pressed to a string in a plodder having a cooled head and of which the screw is rotated at a much lower speed than in the production of common toilet soaps. Finally bars or pieces of the desired size and shape are formed from the string of soap.

The process may be carried out with any desired fatty mixture of the kind hitherto used for the production of transparent soaps. In most cases even the use of glue fats or of castor oil (which is particularly well suited for transparent soaps) may be dispensed with.

The novel process may for instance be carried out in the following manner:

A fatty mixture of suitable composition is saponified in the presence of a sufficient amount of resin, preferably without the addition of any electrolytes. The treatment is conducted in such a manner, that a substantially neutral soap is obtained, in which no perceptible quantity of free alkalies is present and which is highly concentrated, so that the mass, after complete saponification, contains about 64-66% of actual soap and is usually of a very thick consistency. The fatty substances and the alkali used should, as in the case of known transparent soaps, be very pure.

Soaps obtained in the manner described above without the use of known filler substances will normally solidify to a crystalline non-transparent mass. If, however, the hot liquid mass not only is cooled to a low degree (for instance in cooling plate machines) but also is suddenly cooled in the form of a thin layer, glass-clear, transparent strips or slabs are obtained. The temperature must be very rapidly reduced to room temperature, in order to avoid the formation of crystals at the usual solidification temperature. Crystallization is also retarded by the presence of the resin soaps. The sudden cooling is preferably performed on rollers cooled to a low degree.

The soap produced by the method described above is dried if necessary. The drying should be performed in an air current at normal temperature, since crystallization would take place if the mass were heated. The amount of moisture or fatty acid which the soap must contain before it is treated in the plodder depends upon the composition of the batch of fatty matter used. For normal batches the contents of fatty acid should not greatly exceed 70%, since otherwise a super-saturated solid solution is obtained and crystals are formed in spite of the previous sudden cooling. The soap is now fed into a plodder having a cooled pressing head. The conveyor screw or worm of the plodder is rotated at a...
speed which is considerably lower than the speed normally used in the manufacture of toilet soaps. If necessary, the number of revolutions of the feed screw is reduced to half the normal number. On account of the colloidal structure of the transparent strips the soap is very tough and dense and the plodder must therefore be operated at a speed which is considerably lower than when producing normal kneaded soap, in order that air entering the plodder with the soap mass may have ample time to escape. If the plodder is run at a too high speed air bubbles will be enclosed in the mass and impair the appearance of the otherwise homogeneous, transparent soap. From the finished transparent string of soap pieces of the desired size and shape are formed in known manner by means of a suitable device.

When the soap mass in the form of a thin layer has been suddenly cooled on cold rollers, the mass is simultaneously dried and, in some cases, the desired degree of dryness is also obtained by this treatment. It will, however, in many cases be necessary to subject the mass to a subsequent drying treatment, and this treatment must be performed with care, since the mass will turn turbid if said treatment is exaggerated. If the soap string leaving the plodder should be turbid, a small amount of water is added to the mass and the mass is once more passed over the cold rollers, whereupon the treatment is continued in the manner described above.

**Example 1**

A batch of fatty matter consisting of 61 kg. of tallow, 18 kg. of cocoa nut oil, 11 kg. of castor oil and 10 kg. of saponifiable natural resin is, after cautious purification, saponified with 45.8 kg. of purified soda lye of 39° Bé. The transparent, hot, almost neutral soap gel is thereupon applied to cooled rollers in such a manner, that, in the course of few (2-3) seconds, the temperature is reduced from 90°-100° C. to about 20° C. The ribbons or plates are scented, kneaded once or twice on cold rollers and are thereupon, while containing about 71% of fatty acids, passed through a slow operating plodder, the head of which is cooled. The string of soap is cut up and pieces of suitable size and shape are formed from the same. The obtained soap is very transparent and is immediately in transportable state. When stored the soap will dry without altering its shape. Finally the soap has a fatty acid content of about 73-75%.

**Example 2**

A batch of fatty material consisting of 92 kg. of crude palm oil and 8 kg. of saponifiable natural resin is purified, completely saponified with 42.9 kg. of soda lye of 38° Bé, and subjected to a further treatment as described above.

The obtained transparent soaps are non-filled, kneaded toilet soaps of high quality and glasslike transparency. On account of their high percentage of fatty acids, usually amounting to 71-75%, they are very economical in use and are not used up as rapidly as the transparent soaps hitherto known. The novel soaps are agreeable to the skin and may be produced at low costs. Other advantages of the novel process reside in the shortening of the time required for producing the soap and in the fact that it is not necessary to store the soap for any length of time. The soaps may therefore be placed on the market immediately after the same have been manufactured. In contrast to this the heretofore known low-percentage transparent soaps must be stored for a considerable time before the desired high degree of transparency is obtained. The novel soaps may be scented in the same manner as the usual toilet soaps.

I claim:

1. A process of producing transparent kneaded toilet soaps containing a high percentage of fatty acids consisting of saponifying a mixture of fats and saponifiable natural resin with concentrated soda lye not substantially in excess in the substantial absence of an electrolyte, and while the soap is at a temperature of liquefaction suddenly cooling it to a temperature sufficiently low to prevent crystallization, drying the soap under conditions which prevent crystallization, subsequently kneading and plodding while cooling the soap, and then forming the soap into bars.

2. A process of producing transparent kneaded toilet soaps containing a high percentage of fatty acids comprising the steps of saponifying a batch of fatty matter by means of concentrated alkalies not substantially in excess in the presence of saponifiable natural resin in an amount sufficient to retard the formation of crystals, spreading the obtained hot fluid soap in a thin layer, cooling said layer suddenly to normal temperature, kneading the obtained mass on cold rollers, passing the mass through a plodder, and forming pieces of the desired size and shape from the mass delivered from said plodder.

3. A process of producing transparent kneaded toilet soaps containing a high percentage of fatty acids comprising the steps of saponifying a batch of fatty matter by means of concentrated alkalies not substantially in excess in the presence of saponifiable natural resin in an amount sufficient to retard the formation of crystals, spreading the obtained hot fluid soap in a thin layer, cooling said layer suddenly to normal temperature, drying the obtained mass under conditions to prevent a crystallization of same, kneading the obtained mass on cold rollers, passing the mass through a plodder having a cooled head and operating at relatively low speed, and forming pieces of the desired size and shape from the mass delivered from said plodder.

4. As an article of manufacture the product produced by the process of claim 1, consisting of a substantially transparent, kneaded toilet soap bar containing substantially seventy-one per cent to seventy-five per cent of fatty acids and having the original shape that it had when stamped as a bar.

WILHELM PAPE.