

# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN THE MANUFACTURE OF RESIN-SOAP.

Specification forming part of Letters Patent No. **106,322**, dated August 16, 1870.

*To all whom it may concern:*

Be it known that I, DUDLEY B. CHAPMAN, lately of the city and county of Providence, in the State of Rhode Island, but now of the city and county of New London, in the State of Connecticut, have discovered and invented a new and useful Improvement in the Manufacture of Soap; and I do hereby declare that the following specification is a full, clear, and exact description thereof.

My invention consists in an improvement in the manufacture of soap, which resides in saponifying or saturating colophony or gum-resin with a crystallized carbonate of soda dissolved by heat in its water of crystallization, and afterward mechanically incorporating said saponified or saturated resin into and with a soap made by any of the usual processes known to the trade while the soap is in a fluid or pasty condition.

To enable others skilled in the art to make use of my invention, I will proceed to describe the method of saponifying or saturating the resin, and of afterward incorporating it with soap.

In the first place I pulverize the resin by any convenient means as finely as possible. The finer it is pulverized the better. Next I dissolve the soda by heat in its water of crystallization. (A small quantity of water may be added to assist in dissolving the soda; but it is not essential.) As soon as the soda is dissolved, I next incorporate with it about five per cent. of its weight (more or less) of starch or analogous substances wet in its weight of water or dissolved soda. Next I add a small quantity of the pulverized resin, keeping a steady heat under the kettle, and keeping the whole constantly stirred until the resin melts. As fast as the resin melts I add more, and continue the operation until I have the required quantity, taking great care that the heat at no time is raised above 96° centigrade.

After the resin is melted and thoroughly combined with the soda the mass should be strained through a sieve while hot, to remove any impurities that the soda or resin may have contained, after which it is ready for use at any time it may be required.

If the manufacturer elects, he may omit the starch or analogous substance in preparing

the saponified resin without impairing its detergent quality; but when the starch is omitted the soap produced by the use of my saponified resin sometimes has a sticky surface in damp weather. To prevent this the starch is used.

If the soap with which I intend to incorporate the saturated or saponified resin is so manufactured that it would possess an ordinary degree of firmness when cooled and cut into bars without the addition of the saturated resin, I use one pound of soda to saturate one pound of resin.

If the soap into which I intend to incorporate it is so manufactured as to have less than an ordinary degree of firmness when cooled and cut into bars without the addition of the saturated resin, I use relatively a large proportion of soda in saturating the resin, being careful not to use enough to produce efflorescence on the soap produced by the incorporation. Therefore I would not in any case advise to use more than one and one-third pound of soda in saturating one pound of resin.

Having prepared my saturated resin as described above, I usually take three parts of soap, made and otherwise finished by any of the processes known to the trade, and, while the same is in a fluid or pasty condition, add one part of the saturated resin, and mechanically mix soap and resin together until they have become completely incorporated and the mixture presents a homogeneous appearance. I then frame it, and when properly cooled I cut it into bars for the market. The mean temperature at which the soap should be framed may usually be found somewhere between 60° centigrade and 80° centigrade. A soap containing a large per cent. of resin in its original composition, or before my saturated resin is added, should be framed at the lower temperature, and the temperature of framing should be increased as the percentage of resin in the original soap is diminished.

If the soap with which the saturated resin is incorporated is technically known as "settled," "pitched," or "fitted" soap, the addition of the saturated resin renders it very stiff and pasty, and after the soap is cooled and cut into bars it is much firmer than it would have been without the addition of the satu-



rated resin; but if the soap with which it is incorporated is technically known as "curd," or "boiled-down" soap, the addition of the resin does not materially change its appearance or increase its firmness.

The proportions of finished soap and saturated resin may be changed or altered as the inclination of the manufacturer may dictate, and a good result may be expected if too much of the saturated resin is not put into soap already highly resined in the process of manufacture—*e. g.*, into soap made in the proportion of sixty pounds of resin to one hundred pounds of tallow I would not recommend to incorporate more than one part of the saturated resin to three parts of soap. A more highly resined soap should have less of the saturated resin incorporated with it, while a soap containing much less resin in its original composition may have one part of the saturated resin incorporated with two parts of the soap.

The advantages of my invention are:

First, all soaps produced by the addition of my saturated resin or compound, except the lower grades of curd or boiled-down soap, are rendered harder or firmer by such addition.

Second, it requires a larger quantity of carbonated alkali than of caustic alkali to saturate or saponify a given quantity of resin; hence by saturating my resin with a carbonated soda I introduce a larger quantity of alkali—which is the real detergent principle or agent—into the soap.

Third, this alkali, being first neutralized with carbonic acid, and, secondly, saturated with the resin, is rendered entirely innocuous, and will not injure the most delicate fabric.

Fourth, the alkali being first neutralized by carbonic acid, and, secondly, saturated with resin, the soap containing it is more easily decomposed. Therefore it will be found that soaps containing my compound yield a more copious lather and possess better detergent properties than soaps which do not contain it.

Fifth, as before stated, because of the presence of the carbonic acid in a carbonate of soda, it requires a much larger quantity of carbonate of soda than of caustic soda to saturate or saponify a given amount of resin. Therefore every pound of resin yields, by my process, about two pounds of soap, whereas by the usual method of saturating with a caustic alkali it yields only about one and a half pound of soap.

Sixth, assuming the average cost price of the best grades of resin soap to be from seven to eight cents per pound, the cost of my compound, labor included, will not exceed three cents per pound. Therefore soaps containing my compound can be manufactured from ten to fifteen per cent. cheaper than by any other method employed to produce soaps of equal quality.

I do not claim either of the substances employed in the preparation of my compound as an ingredient in the manufacture of soap.

I am aware that the saponification or saturation of resin with a carbonate of soda in the manufacture of soap is no novel invention; but, as far as I am informed on the subject, this has been accomplished in the boiling or pan or kettle during the earlier processes of manufacture, and before what is technically known as the "strengthening" or final change of lye. During the boiling on this strengthening change it is customary to remedy any imperfect saponification that may have occurred in any of the previous changes by adding caustic lye until the soap exhibits the required test of strength by its caustic action on the tongue of the manipulator. Resin saponified with an excess of carbonated alkali has no caustic action on the tongue, while the slightest excess of caustic alkali is readily perceived by the taste. A caustic alkali has also a much stronger affinity for resin than a carbonated alkali possesses. Therefore it will expel the latter from its combination with resin and usurp its place.

By the mode hitherto adopted of saponifying resin with a carbonated soda or other alkali, and afterward strengthening it with a caustic alkali, the required test of strength was not exhibited until all the carbonated alkali had been expelled from the combination and wasted in the exhausted lyes, thereby materially increasing the cost of the soap. For this and other reasons the saponification of resin with a carbonate of soda has been, as far as my knowledge extends, universally abandoned. Therefore I do not claim the saponification or saturation of resin with a carbonate of soda or soda-ash.

By my method the soap is made and otherwise finished before adding the resin which has been saponified with a carbonated soda. Therefore there is no danger that the carbonated soda will be expelled from a combination with the soap by coming in contact with a free caustic alkali.

What I claim as my invention, and desire to secure by Letters Patent, is—

The improvement in the manufacture of soap which consists in the employment of a saponified-resin compound prepared with crystallized carbonate of soda, substantially as described, and mechanically incorporating the same with the soap while in a fluid or pasty condition, as herein specified.

DUDLEY B. CHAPMAN.

Witnesses:

GEORGE T. BECKWITH,  
BENJAMIN P. WATROUS.